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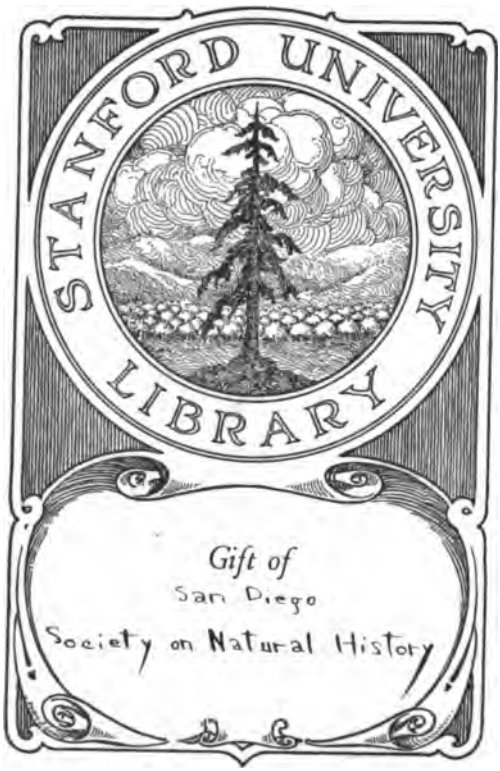

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Palaeozoic Crustacea

The publications and notes on the genera and species during the past twenty years, 1895-1917

BY

ANTHONY WAYNE VOGDES

TRANSACTIONS SAN DIEGO SOCIETY ON NATURAL HISTORY

VOL. III, No. 1. July 20, 1917

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The publications and notes on the genera and species during the past twenty years, 1895-1917

BY
ANTHONY WAYNE VOGDES

The object of this fasiculus is to give all the literature on the Palaeozoic Crustacea, also a general index to its contents, with a list of the species and remarks on them. This will aid the student in his researches and save time in looking up the descriptions of the species and genera.

TRANSACTIONS SAN DIEGO SOCIETY OF NATURAL HISTORY

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INTRODUCTION

In offering this supplement to the literature of the Palæozoic Crustacea, the author has brought the list up to date, and corrected some errors and omissions in his Bibliography, previously published by the California Academy of Sciences.

The author has consulted the original papers and the bibliographies of the following authors:

1 **Gehler** (J. C.) De quibusdam rarioribus agri Lipsiensis petrifactis.
Spec. 1, Trilobites Entomolithus pararadoxus Linne, Lipsiae, 1793, pp. 7-9.
The author gives a list of works on fossil crustacea.

2 **Walch** (J. E. T.) Des Trilobites dan le regne des petrifications, etc.
Natural History of Petrifactions to illustrate Knorr's Collection.
Nuremb. fol., part 2, pp. 95 (1768) and part 3, pp 120 (1771).
The author gives the name of Trilobites to the class and brought together everything that had been hitherto written on the Trilobites.

3 **Brunnich** (M. T.) Beskrivelse over Trilobiten.
Nye Samlig. of det Kongelige Danske Videnskabers Selskabs Skriften, Kiöbenhavn, 1781, pp. 384-389.
Gives historical sketch of the papers on Trilobites.

4 **Burmeister** (Hermann). The Organization of Trilobites.
German Edition, 1843; English Edition, 1846.
The author gives a Bibliography, pp. VII-X, 1698-1845.

5 **Barrande** (J.) System Silurien du centre de la Bohéme, 1852, Trilobites.
Vol. 1, and supplement.
Gives Bibliography of the families.

6 **Törnquist** (S. L.) Undersogningar öfver Siljansomradets Trilobitfauna.
1884, Sveriges Geol. Undersökning, ser. C, No. 66, pp. 4-7.
Gives list of authors.

7 **Schmidt** (Fr.) Revision of the Baltic Silurian Trilobites.
Mem. Acad. Imp. Sci., St. Petersburg, 1881-1907.
Notes on the genera and bibliography.

8 **Holm** (G.) De Svenska Arterna af Trilobitslaget Illaenus.
Bihang till K. Svenska Vet. Akad Handl. Bd. 7, No. 3, 1882.
Gives the Literature on the genus Illaenus, 1853-1872, pp. V-XIV.

9 **Vogdes** (A. W.) A Bibliography of Palaeozoic Crustacea from 1698 to 1889, including a list of North American species and a systematic arrangement of the genera.
Bull. U. S. Geol. Sur., No. 63, 1890.
This paper gives a list of authors; also that of the genera, but not that of the species described in each work.
The 2d and 3d parts a Catalogue of North American species.

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10 **Vogdes** (A. W.) A classed and annotated Bibliography of the Palaeozoic Crustacea, 1798-1882, to which is added a Catalogue of North American species.

California Acad. Sciences Occasional Papers, No. 4, 1893.

This work contains a list of the genera and species described in each paper and a catalogue of North American species.

11 **Vogdes** (A. W.) A supplement to the Bibliography of the Palaeozoic Crustacea.

Proc. Cal. Aca. Sci., 2d ser., vol. V, 1895, pp. 53-76.

12 **Taschenberg** (O.) Bibliograeca Zoologica II. verzeichniss der schriften ueber Zoologie welche in den Periodischen werken, 1861-1880, pp. 5165-5188, Leipzig, 1905.

13 **Calman** (W. T.) Zoological Record Crustacea X, vol. 39-47, 1902-1913.

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A Classified and Annotated Bibliography of the Palaeozoic Crustacea, Part 2; Supplement to Occasional Papers California Academy of Science, Embracing the Publications for the Years 1895 to 1917.

Airaghi (Carlo). Di alcuni Trilobiti della cina.

Atti Mus. Milano, vol. 41, 1902, pp. 3-13, plate.

The author describes *Agnostus Pii* n. sp. compares *Agnotus acadicus* Hartt and other species, the new species very much like *Agnotus Chinenis*, Dames, 1883.

Olenoides Paronai n. sp., *O. Leblanci* Berg. *Microdiscus Paronai* n. sp.

Drepanura premesnili, Berg. Trilobites gen. sp. ind.

Part 2 describes a Trilobite from Scitan tung, Teingan, as *Cheirurus Paronai* n. sp.

Ami (Henry). *Belinurus grandaevus*, a new species of Palæozoic limuloid Crustacean recently described by Prof. T. Rupert Jones and Dr. Henry Woodward, from the Eo-Carboniferous of Riversdale, Nova Scotia.

Ottawa Nat., vol. 13, 1899, pp. 207-208.

See also Geol. Mag., Decade 4, vol. 6, 1899, pp. 388-395, pl. 15.

The genus Belinurus has been found in Lower Devonian and Silurian forms in the Kiltorcan beds of Ireland.

See Review of this paper, Geol. Mag., Decade 4, vol. 7, p. 177, 1900.

Andrée (Karl). Zur Kenntniss der Crustaceen Gattung Arthropleura Jordan, und dern systematischer Stellung.

Palæontographica Bd. 57, Stuttgart, 1910, pp. 67-103, plates 4-5. *Arthropleura armata*, Jordan, *A. mammata*, Salter.

Gives a Bibliography of the literature on *Arthropleura*, 1854, 1909.

——— Neue Funde von *Arthropleura armata* Jordan.

Centralbl. für Mineral, 1909, pp. 753-755.

Arber (E. A. Newell). The Culm Measures of the Exeter District.

Geol. Mag. Decade 5, vol. 8, 1911, p. 495.

The Arthropod remains from Nottinghamshire and Derbyshire coal fields in this paper are described and illustrated by Lewis Moysey.

Leaia trigonoides sp. nov. Glabella region of Prestwichia figured.

Baldwin (Walter). Belinurus Konig from Sparth, Rochdale.

Trans. Manchester Geol. and Mining Soc., vol. 28, pt. 6, 1905, pp. 198-202.

The author remarks Belinurus is generally associated with Unio-like shells and scattered plant remains, and suggests that it was an inhabitant of shallow, muddy water and lived in close proximity to the shore line. He also gives a Bibliography of the genus.

Belinurus forms were first discovered in the Pennystone iron nodules of the Coal Measures at Dudley in Staffordshire and Coalbrook Dale, in Shropshire.

Martin, the first author to describe a species in 1809 (Petrifacata Derbiensia, pl. 45, fig. 4), classes it among the Trilobites as *Entomolithus lunatus*.

Charles Koenig, who was the first keeper of the Mineralogical and Geological Department in the British Museum in the year 1825.

Published under the title of Icones Fossilium sectiles, n. d. (1820) in two parts:

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The First Centuria has only 8 plates and 100 figures accompanied by descriptions.

The Second Centuria, consisting of plates 9-18, figures 101-248, was issued without text descriptions.

Koenig gives the name of *Belinurus bellulus* to fig. 230, without a description of the new genus.

———*Prestwichia anthrax and Belinurus lunatus* from Sparth Bottoms, Rochdale.

Trans. Manchester Geol. Soc. vol. 29, 1904-1905, pp. 124-127, with 2 figures.

The author figures *Prestwichia anthrax* described under the name of *Limulus anthrax* by Prestwich in 1840, and refers to *Belinurus lunatus* Konig's *Belinurus bellulus.*

The author remarks, that it certainly is not a fossil insect, as indicated by Martin in Petrifacata Derbiensia, pl. 45, fig. 4, 1809.

Bather (F. A.) *Harpes bucco.* A new Silurian Trilobite from the Carnic Alps.

Catania Rivista Italiana di Palæont., 1910, 7 pp., figure.

The trivial name bucco alludes to the swollen cheek roll, which with its ornament is so marked a character to the species.

Barth (Hermann von). Die Stellung der Trilobiten in Zoologischen Systeme.

Das Ausland 26 Jahrg, 1875, p. 25.

The author quotes Billings's paper; also that of Dana on the feet of Trilobites, and refers to the discoveries of E. von Eichwald in Wesenberg in Estland, and in the Island Dago near Hohenholm.

N. Jahrb für Mineral. and Geol. vol. 1, 1875.

Barton (Donald C.) A new genus of the Cheiruridae with descriptions of some new species.

Bull. Mus. Comp. Zoology, vol. LIV, No. 21, 1913, with one plate.

The new genus Ceraurinus is like *Cheirurus insignis* Beyrich in size.

The glabella is subrectangular or expanded only slightly. The posterior of the 3 pairs of glabellar furrows are straight, about one-third the width of the glabella in length, and slope gently backwards.

Their inner ends are connected with the neck furrows by curving constrictions, which are about parallel to the axis of the glabella.

The constrictions are strong in some species and flat in others.

The middle part of the axial portion of the neck furrow is parallel to the posterior edge of the neck segment.

The eyes large.

Thorax 11 segments, presumably.

Pygidium only in *C. icarus* Billings, three to four segments ending in six free spines of equal length.

Type *Ceraurinus marginatus* sp. nov.

The author includes in the genus *C. icarus* Billings, *C. trentonensis,* sp. nov., *Crytometopus scofieldi* Clarke, *Cheirurus polydorus* Billings, and *C. pompilius* Billings.

He refers *Ceraurus meekanus* Miller, 1889, to *C. icarus* Billings.

The paper ends with a fragment, described as *Ceraurinus confluens,* n. sp.

——— A revision of the Cheiruninae with notes on their evolution.

Washington Univ. Studies, vol. 3, part 1, No. 1, 1915.

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BARTON (Donald C.)—Continued

The author places under the family cheirurinae twenty genera divided into two sections.

Group 1. Cheirurinae with plural furrow horizontal, thoracic segment rarely 9, generally with 10 or 12.

Under this group he places:

Eccoptochile Corda, genotype *E. claviger* Beyr., with figure.

Actinopeltis Corda genotype *A. globosus* Barr, with figure.

Cyrtometopus Angelin genotype *C. clavifrons* Dal., with figure.

Sphaerexochus Beyrich genotype *S. mirus* Beyr., with figure.

Anacheirurus Reed genotype *A. Frederici* Salt., with figure.

Pilekia new genus genotype *Ch. apollo* Bill., with figure in text.

This is an early Ordovician genus unlike the Cheirurinae. The author figures the glabella, which contracts forwards with three pair of glabellar furrows; pygidium composed of 4 complete segments and a terminal axial plate, the ribs terminating in long spines. He refers *Ch. gracilis* Barr. Cyr. *foveolatus Ang.* and with doubt *Ceraurus Clintoni* Foerste to the genus.

Nieszkowskia Schm. genotype *N. cephaloceras* Nieszk., with figure.

Kawina new genus genotype *Ch. vulcans* Bill., fig. of head in text.

The glabella large and composing one-half of the head strongly swollen, and with a tendency for a faint hump at the posterior. Three pairs of glabellar furrows, facial suture running almost parallel to the sides of the glabella, and cutting the border at the genal angles or slightly in towards the axis. Genal angles without spines.

The author refers to this genus *Ch. prolificus* Bill., *Ch. mercurius* Bill., *Pseudo-sphaer. Billingsi* Raym. and *Pseudo-sphaer. approximus* Raym.

Pseudosphaerexochus Schm. genotype *P. hemicranium* Kut., with figure, includes 11 species. *Cheirurus Paronai* Airaghi probably belong here, but the author does not include it.

Placoparia Corda genotype *P. Zippei* Boeck, with figure.

The author includes also *Calymmene tourneminei* Rouault, but does not mention *P. cambriensis* Hicks.

Area Barr. genotype *A. bohenica* Barr., fig. in text.

The author includes *A. Fritschi* Barr., but no mention of *A. suecica* Olin.

Prosopiscus Salter genotype *P. mimus* Salt., with figure.

Typhloniscus Salter genotype *T. Bainii*, figure in text.

Sphaerocoryphe Angelin genotype *S. dentata* Ang.

This is a Swedish species, the figure 16 in the text after Schmidt, looks more like *S. cranium* Schm. pl. 8, fig. 7.

Hemisphaerocoryphe Reed genotype *H. pseudo-hemicranium* Nieszk., with figure.

This is an intermediate genus between Cyrtometopus and Sphaerocoryphe. From Cyrtometopus this genus can be distinguished by its highly inflated frontal lobe. From Sphaerocoryphe it may be distinguished by its obtusely triangular free cheeks and by its posterior pair of glabellar furrows, which bend sharply backward instead of extending across the glabella.

The author includes besides the type *Metopias aries* Eichw. and Cyrt., *Rosentali* Schmidt.

Group 2. Cheirurinae with constricted pleurae and with diagonal pleural furrows, Lehua nov. genotype *Ch. vinculum* Barr.

The genus resembles Eccoptochile and Anacheirurus. From the former it is most readily distinguished by its lack of eyes or, if present, situated far forward, and by the diagonal pleural furrow, and by the slender spine-like termination of the pleurae.

The author includes besides the type *Typhloniscus princeps* Reed and *Ch. inexpectatus* Barr.

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BARTON (Donald C.)—Continued

Cheirurus Beyrich genotype *Ch. insignis* Beyr., with figure.

The genus can be readily distinguished from Ceraurus and Ceraurinus by the triangular basal lobes of the glabella, the inner points of which are not separated by a portion of the glabella; also by the hypostoma.

Crotalocephalus Salter, genotype *C. Sternbergi* Boeck. Fig. of head in text.

Ceraurinus Barton, genotype *C. marginatus*. Fig. in text.

Distinguished from Cheirurus and Ceraurus by the rather large ovate to subrectangular basal glabellar lobes.

Ceraurus Green, genotype *C. pleurexanthenus*. Fig. in text.

The author does not include Youngia, a genus described by Lindstrom, with *Cheirurus trispinous* for its type, in 1885—not Youngia, Jones & Kirby, 1886.

The genus has long genal spines with aculate occipital ring, and may be compared with Nieskkowskia.

Lindstrom genus has a peculiar axis to the thorax, the first axial joint being furnished with a pair of small lateral processes on the anterior margin.

Barbour (E. H.) Carboniferous Eurypterids of Nebraska.

Am. Jour. Sci., 4th ser., vol. 38, 1914, p. 507, figs. 1 and 2.

The author describes *Eurypterus (Anthraconectes) nebraskensis* nov., from the Coal Measures near Peru, Nebraska.

The main features are the vermiform appearance, the long spatulate paddles, and the spinous ridges upon the last 5 tergites of the post abdomen.

Fig. 2 represents an unnamed sp.

Basser (Ray S.) Bibliographic index of American Ordovician and Silurian Fossils.

U. S. Natl. Mus. Smithsonian Inst. Bull. 92, volumes 1 and 2, 1915.

The author gives a historical index to the genera and the North American species of Palæozoic crustacea during Ordovician and Silurian epochs.

Beecher (Charles E.) Notes on Cambrian fossils of St. Francis County, Missouri.

Am. Jour. Sci., ser. 4, vol. 12, 1891, pp. 362-363.

——— On the thoracic legs of Triarthrus.

Am. Jour. Sci., ser. 3, vol. 46, 1893, pp. 469-470.

——— The larval stages of Trilobites.

Am. Geol., vol. 16, 1895, pp. 166-197, plates 8-10.

The author gives a review of larval stages of Trilobites.

Analysis of variations in Trilobite larvae.

Antiquity of the Trilobite.

Restoration of the protaspis, etc.

The author remarks in regard to the larval stages of the following Trilobites from the Cambrian:

Solenopleura robbi Hartt., after Matthew.

Larva very minute and circular in outline; the glabella is obscurely annulated and extends to the anterior margin, where it is expanded.

The neck ring is only one, well defined; abdominal portion is less than one-third the whole length, and is limited by a slight transverse furrow; no traces of eyes or free cheeks.

Liostracus onangondianus Hartt., after Matthew.

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BEECHER (Charles E.)—Continued

This form is similar to the preceding though larger, and with the glabella more rapidly expanding in front. The neck segment is the only one which is distinct.

Ptychoparia linnarssoni Walcott, after Matthew.

The axis is narrow, expanding in front, and obscurely ringed; 5 annulations belonging to the head and one to the pygidium, which is very short and separated from the cephalon by a distinct groove.

Ptychoparia kingi Meek.

The author remarks that fig. 6 which is referred to a later stage, shows the inception of several characters that have not as yet appeared in the previous larvae. The axis is very strongly annulated; the anterior lobe is nearly as long as the 4 posterior annulations of the cephalon, and on each side there is a furrow representing the eye line of the adult; the free cheeks are present as narrow marginal plates including the genal spines; the pygidium shows 2 segments separated by a furrow.

The author figures *Sao hirsuta* Barrande, pl. 8, figs. 8-1.

Ordovician species.

Triarthrus becki Green.

Two protaspidan stages of this species have been noticed, differing chiefly in the size of the pygidium. Both agree in showing a strongly annulated axis, not expanded in front and terminating some distance within the margin.

Acidaspis tuberculata Conrad.

In general form the larvae resembles those of the second larvae stage of Sao, but the pygidium is shorter and the glabella does not expand and terminate in the anterior margin. No eye-line is present, but the eye lobes may be seen a little within the margin. The glabella has the characteristic number of annulations: margin provided with a row of denticles; genal angles extended into spines; pygidium with 4 spines.

The generic term *Arges* Goldfuss pre-occupied. See Ceratages, Gürich, 1901.

Arges consanguineus Clarke.

As the main details of structure in Acidaspis and Arges are so similar the young Arges show the same acceleration in the development of the spines and surface ornamentation and the retention of the primitive features of the glabella.

Proetus parvisculus Hall.

The illustrations of this species show strongly annulated axis with groove at each side; large, prominent anterior eyes, pygidial pleura indicated by faint grooves.

Dalmanties socialis Barrande.

The author gives 4 figures of this species.

The anaprotaspis stage showing the large, strongly annulated axis, the prominent anterior marginal eyes, mucronate genal angles. Pygidium of 3 segments.

Figures 1-8 in the text illustrate the young of *Agnostus nudus* Barr.

A. rex Barr., *Trinucleus ornatus* Sternb., *Hydrocephalus saturnoides* Barr. and *H. carens* Barr., *Olenellus (Mesonacis) asaphoides* Emmons.

——— The Monophology of Triarthrus.

Am. Jour. Sci., ser. 4, vol. 1, No. 4, 1896, pp. 251-256.

Geol. Mag., Decade 4, vol. 3, 1896, pp. 193-197, pl. 9.

——— Outlines of a natural classification of the Trilobites.

Part 1, Am. Jour. Sci., ser. 4, vol. 3, 1897, pp. 89-106, plate 3; continued on pp. 181-207.

Order Hypoparia.

Free cheeks, forming a continuous marginal ventral plate of the head, and in some forms also extending over the dorsal side at the genal angles.

Suture ventral marginal, or submarginal.

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BEECHER (Charles E.)—Continued

Compound paired eyes absent; simple eyes may occur on each fixed cheek singly or in pairs.

Including the families Agnostidae Dalman, Fam. 2, Harpeididae Barrande, Fam. 3, Trinucleidae Barrande.

The first family includes the genera Agnostus Brongniart and Microdiscus (Emmons) Salter.

The second family, the genera Harpes, Goldfuss, Harpina Novák and Harpides Beyrich.

The third family, Trinucleus Lhwyd, Ampyx Dalman, Dionide Barrande, Endymionia Billings, Lonchodomas Angelin, Raphiophorus Angelin and Salteria W. Thompson.

Order B Opisthoparia.

Free cheeks generally separate, always bearing the genal angles.

Facial sutures extending forwards from the posterior part of the cephalon within the genal angles, and cutting the anterior margin separately, or rarely uniting in front of the glabella.

Compound paired holochroal eyes on free cheeks, and well developed in all but the most primitive families.

Fam. 4, Conocoryphidae Angelin, including the genera and subgenera.

Conocoryphe Corda Aneucanthus Ang. Atops Emmons, Avalonia Walcott, Bailiella Matthew, Bathynotus Hall, Carausia Hicks, Carmon Bar.

Ctenocephalus Corda, Dictyocephalites Bergeron, Eryx Ang., Harttia Walc., and Toxotis Wallerius.

Family 5, Olenidae Salter, including the genera.

Olenus Dalm. and the following genera and subgenera, which should fall into several sub-family or even family groups.

Acerocare Ang., Acrocephalites Wallerius, Agraulus Corda, Angelina Salter.

Anomocare Ang., Anopolenus Salter, Asaphelina Bergeron, Bavarilla Barr.

Bergeronia Matthew, Boeckia Brögger, Ceratopyge Corda, Chariocephalus Hall.

Corynexochus Ang., Crepicephalus Owen, Ctenopyge Linnarsson, Cyclognathus Linrs, Dikelocephalus Owen (Centropleura Ang.), Dorypyge Dames.

Ellipsocephalus Zenker, Elliptocephala Emmons, Euloma Ang., Eurycare Ang., Holmia Matthew, Hydrocephalus Barr. (young Paradoxides), Leptoplastus Ang., Liostracus Ang., Loganella Devine, Menocephalus Owen, Mesonacis Walc., Micmacca Matthew, Neseuretus Hicks, Olenelloides Peach, Olenellus Hall, Olenoides Meek, Oryctocephalus Walc., Paloeopyge Salter, Parabolina Salter, Parabolinella Brögger, Paradoxides Brong., Peltura Ang., Plutonides Hicks, Proceratopge Wallerius, Protagraulos Matthew, Protolenus Matthew, Protopeltura Brögger, Protypus Walc., Pterocephalia Roemer, Ptychaspis Hall, Ptychoparia Corda, Remopleurides Portlock, Sao Barr., Schmiditia Marcou, Solenopleura Ang., Sphaerothalmus Ang., Telepus Barr., Triarthrella Hall, Triarthrus Green, and Zacanthoides Walc.

A number of genera have been made the types of family divisions, as Paradoxides, Olenellus, Remopleurides, Ellipsocephalus, Ptychoparia, etc.

Family 6, Asaphidae Emmrich, including the genera and subgenera.

Asaphus Brong., Asaphellus Callaway, Asaphiscus Meek, Barrandia McCoy, Basilicus Slater, Bathyurellus Billings, Barthyuriscus Meek, Bathyurus Bill., Bolbocephalus Whitfield, Brachyaspis Salter, Bronteopsis W. Thompson, Dolichometopus Ang., Gerasaphes Clarke, Holasaphus Matthew, Homalalopecten Salter, Isotelus Dekay, Megalaspides Brögger, Megalaspis Ang., Niobe Ang., Ogygia Brong., Ogygiopsis Walc., Phillipsinella Novak, Platypeltis Callaway, Ptychopyge Ang. and Stygina.

The author includes under Illaenidae the genera Illaenus Dalm., Æglina Barr.,

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BEECHER (Charles E.)—Continued

Bumastus Murch., Dysplanus Burmeister, Ectillaenus Salter, Holocephlina Salter, Hydralenus Salter, Illaenopsis Salter, Illaenurus Hall, Nileus Dalm., Octillaenus Salter, Panderia Volboth, Psilocephalus Salter, Symphysurus Goldfuss, and Thaleops Conrad.

Family 7, Proetidae Barrande.

Genera Proetus Steininger, Arethusina Barr., Brachymetopus McCoy, Celmus Ang., Cordania Clarke, Crotalurus Volb., Cyphaspis Burm., Dechenella Kayser, Griffithides Portl., Phaetonella Novák, Phillipsia Port., Prionopeltis Corda, Pseudophillipsia Gemmellaro, Schmidtella Tschernyschew, Tropidocoryphe Novak, and Xiphogomium Corda.

Family 8, Bronteidae Barrande.

Family 9, Lichadidae Barrande.

Genus Bronteus Goldfuss (Goldius DeKoninck).

Genera Lichas Dalm., Arctinurus Castelnau, Arges Golf., Ceratolichas Hall and Clarke, Conolichas Dames, Dicranogmus Corda, Homolichas Schmidt, Hoplolichas Dames, Leiolichas Schmidt, Metopias Eichwald, Oncholichas Schmidt, Platymetopus Ang., Teratasپis Hall, Trochurus Beyrich and Uralichas Delgado.

Family 10, Acidaspidae Barrande.

Genera Acidaspis Murch., Ancyropyge Clarke, Ceratocephala Warder, Dicranurus Conrad, Odontopleura Emmrich and Selenopeltis Corda.

Order C, Proparia.

Free cheeks not bearing the genal angles; facial sutures extending from the lateral margins of the cephalon in front of the genal angles, inward and forward, cutting the anterior margin separately or uniting in front of the glabella.

Compound paired eyes, scarcely developed or sometimes absent in the most primitive family; well-developed and schizochroal in last family.

Family 11, Encrinuridae Linnarsson.

Genera Encrinurus Emmrich, Areia Barr., Cybele Loven, Dindymene Corda, Placoparia Corda and Prosopiscus Salter.

Family 12, Calymmenidae Brongniart.

Group 1, Calymmene Brong., and Calymenella Bergeron and Calymenopsis Munier-Chalmas and Bergeron.

Second Group, Homalonotus Koenig, Brongniartia Salter, Burmiesteria Salter, Trimerus Green, Ptychometopus Schmidt; Pharostoma.

Calymenopsis and Calymenella are closely related to Calymmene.

Family 13, Cheiruridae Salter.

Genera Cheirurus Beyrich, Actinopeltis Corda, Amphion Pander, Anacheirurus Reed, Ceraurus Green, Crotalocephalus Salter, Cyrtometopus Ang., Deiphon Barr., Diaphanometopus Schmidt, Eccoptocheile Corda, Hemisphærocoryphe Reed, Nieszkowskia Schmidt, Onycopyge Woodward, Pseudosphaerexochus Schmidt, Sphaerexochus Beyrich, Sphaerocoryphe Ang., Staurocephalus Barr., and Youngia Lindström.

Family 14, Phacopidae Salter.

Genera Phacops Emmrich, Acaste Goldf., Chasmops McCoy, Coronura Hall, Corycephalus Hall and Clarke, Cryphaeus Green (preoccupied for a genus of Coleoptera, 1833), Dalmanites Emm., Homalops Remele and Dames, Monorachos Schmidt, Odontocephalus Conrad, Pterygometopus Schmidt, Symphoria Clarke, and Trimerocephalus McCoy.

Note—Other subdivisions and classification of the Lichidae have been made by Gürich, and also by Reed.

The other families have been reclassified by Reed, Walcott and Raymond. Walcott remarks, in regard to Damesella, that the facial suture cuts the postero-lateral margin outside of the genal angle, so as to leave the genal angle on the fixed cheeks; the spine corresponding to the genal spine in other genera of the order Proparia is on the free cheeks.

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BEECHER (Charles E.)—Continued

——— Trilobites in the Text Book of Palæontology (Zittel's).

Translated by Charles R. Eastman, London and New York, 1900, pp. 607-638.

——— Restoration of *Stylonurus Laconus*, a giant Arthropod from the Upper Devonian of the United States.

Am. Jour. Sci., ser. 4, vol. 10, 1900, pp. 145-150, plate.

——— The same.

Geol. Mag., Decade 4, vol. 7, 1900, pp. 481-485.

The author remarks that this specimen was collected in 1870, and loaned to Prof. Hall and described as *Eurypterus Beecheri* Hall, in 1884, in 36th Ann. Rep. N. Y. Mus. Nat. Hist. as *Stylonurus excelsior* as Hall's species. This paper appeared some months later than Claypole's paper, and the name *Dolichocephala Lacoana* has priority over *Stylonurus excelsior* and must be recognized.

Claypole's paper appeared in Proc. Am. Phil. Soc., vol. 21, April, 1883, to Jan., 1884.

——— Discovery of Eurypterid remains in the Cambrian of Missouri.

Am. Jour. Sci., ser. 4, vol. 12, 1901, pp. 364-366, plate.

Strabops Thacheri n. gen. et sp.

See also Geol. Mag., Decade 4, vol. 8, 1901, pp. 559-564, figure.

The generic name is in allusion to the inward turning or squinting of the eyes (squinting face).

The cephalthorax is comparatively shorter and wider than in Eurypterus; the eyes are further forward, nearer together and more oblique, and besides it has a telson, but 11 abdominal somites can be determined on the dorsal side, instead of 12 as in Eurypterus.

——— Ventral integuments of Trilobites.

Am. Jour. Sci., ser. 4, vol. 13, 1902, pp. 165-174, with 3 plates; also Geol. Mag., Decade 4, vol. 9, 1902, pp. 152-163, with 8 figures.

The author illustrates *Triarthrus Becki* Green, *Ptychoparia striata* Emm., *Asaphus magistus* Locke, and *Calymmene senaria* Conrad.

——— Note on a new Xiphosauran from the Upper Devonian of Pennsylvania.

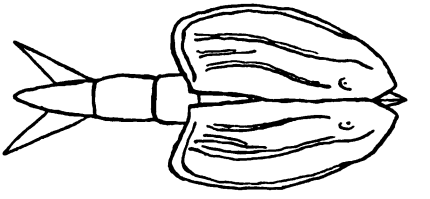
Am. Geol., vol. 29, 1902, pp. 143-146.

Prestwichia Randalli n. sp., with figure.

——— On Palæozoic Phyllopocarida from Pennsylvania.

Quart. Jour., Geol. Soc., vol. 58, 1902, pp. 441-449, plates.

Tropidocaris bicarnatus Beecher, *T. alternata* Beecher, *Elynocaris siliqua* Beecher.



Tropidocaris Bicarinata Beecher

Benden Van (M. E.) On the systematic position of the King Crabs and Trilobites.

Ann. Mag. Nat. Hist., ser. 4, vol. 9, 1872, p. 98.

Bernard (Henry M.) Trilobites with antennae at last.

Nature, 1903.

——— Systematic position of the Trilobites.

Geol. Mag., Decade 5, vol. 1, 1894, p. 230.

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The author remarks the trilobites may be briefly described as fixed specialized stages in the evolution of the Crustacea, from an annelidan ancestor, with its mouth bent round ventrally, so as to use its parapodia as jaws.

——— Application of the sand blast for the development of Trilobites.
Geol. Mag., Decade 4, vol. 1, 1894, p. 553.

Berkey (Charles P.) Geology of the St. Croix Dalles.
Am. Geol., vol. 21, pp. 270-294, plates 18-21, 1898.

The author includes and illustrates the following Trilobites:

Agraulus convexus Whitf., with var. A and B, *A. hemisphericus* n. sp.

Ptychoparia calymenoides (Whitf.). The genotype of Menomonia new genus by Walcott, 1916.

Cheilocephalus n. gen.

The author figures the glabella and fixed cheeks. Cephalic shield semi-circular, strongly convex, about equal to one-fourth part of a spheroid (front limb), formed by a narrow ring projecting at a right angle beyond the general surface of the shield. Glabella broad, convex anteriorly, slightly convergent and reaching to the narrow marginal rim; surface nearly smooth with two pairs of scarcely perceptible furrows; marginal grooves not strongly marked; faint occipital ring, but more strongly marked on the cheeks. Fixed cheeks, broad and conforming to the general spherical outline; the posterior margin developed in a spine-like projection a little removed from the glabella. Eyes a little anterior to the middle and remote from the glabella. Facial sutures extend from the eyes forward almost parallel to the side of the glabella and backward, with a double curve to the genal angle.

Cheilocephalus St. Croixensis n. sp. (Facial suture like Cyclognathus.)

The author also figures *Dikelocephalus misa* Hall, referred by Walcott to the genus Amomocare.

Berjeron (J.) Notes Palaeontologiques.
Bull. Soc. Geol. France, 3rd ser., vol. 23, 1895, p. 465, plates 4-5.

Calymenopsis Filacovi n. gen. et sp. *Amphion Escorti* n. sp.

Dicellocephalus? Villerbruni n. sp. *Asaphelina Barroisi* Mun. Ch. et J. Berg. *Ogygia Lignieresti* n. sp. *Æglina Sicardi* n. sp. *Æglina ? Savini* n. sp. *Dictyocephalus Villerbruni* n. gen. et sp.

The author remarks that the new genus *Calymenopsis,* "Il est caracterise par la presence de pointes genales par la forme de la grande suture; par le presence de cavites dans le sillon anterieur, cavites qui semblent etre comparable a cellos du limbe des *Trinucleus;* par la presence d'une bande oculaire; enfin par la forme en pyramide des joues mobiles."

——— Notes Paléontologique—Crustacés iv étude de quelques Trilobites de Chine.
Bull. Soc. Geol. France, 3rd ser., vol. 27, 1899, pp. 499-515. Plate.

Calymmene ? sinensis n. sp. This species forms the genotype of *Blackwelderia* Walcott, new genus. *Agnostus Douvillei* n. sp. *Olenoides Leblanci* n. sp.

Dicellocephalus? sinensis n. sp. Walcott Cambrian Fauna of China, p. 35, places this species under his new genus *Damesella.*

Drepanura Premesnilli n. gen. et sp. Compare *Bathynotus. holopyga* Hall.

Arthricocephalus Chauveaui n. gen. et sp.

"La caracteristique de cette forme est la structure annelee de tout son corps et en particulier de la glabella. Celle-ci semble formee d'anneaux superposes et a ce point de vue seulement elle rappelle la disposition caracteristique du genre *Olenellus.*"

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Bézier (T.) On *Niloeus Beaumanti* Rouault, 1847.

Palæontologia Universalis Fasc. 3, ser. 2, 1907, p. 119, plate.

The species was described by Rouault, Bull. Soc. Geol. Fr., 2d ser., vol. 14, 1847, pp. 321 and 326.

Distinguished from *Niloeus Armadillo* by its large pygidium.

——— On *Prionocheilus Verneuili* Rouault, 1847.

Palæontologia Universalis Fasc. 3, ser. 2, 1907, p. 120, plate.

The author refers *Calymmene pulchra* Barr., to this species, and refers Corda genus Pharostoma to Rouault's older genus Prionocheilus, which was described by Rouault in Bull. Soc. Geol. Fr., 2 ser., vol. 4, 1847, pp. 320-321, pl. 3, figs. 3 and 3a.

As *Prionocheilus Verneuili,* the holotype shows spines on the outer margin of the head.

The species has been referred to Calymmene by Barrande.

To Pharostoma by Corda, Pompecki and Angelin.

The name of *Verneuili* for a species of Calymmene has been used by d'Orbigny, 1842. Tromelin and Lebesconte, 1876, Assoc. Fr. Sc., Congres Nantes, p. 629, changes the name from *Calymmene Verneuili* to that of *Calymmene Prionocheili.*

Bigot (A.) Catalogue critique de la collection Defrance, conservée au Musée d'histoir Nat. de Caen.

Bull. Soc. Normand, vol. 8, pp. 250-273. Trilobites, pp. 264-65.

Alexander Bronginart and A. G. Demarest used the collection of the Museum in making up their celebrated work on Fossil Crustaceans in 1822.

The collection contains Defrance's original of figs. 2f and 2g.

Calymmene Tristani, which is reproduced, Plate 1A Palæontologia Universalis, by M. Pompejck, in 1903.

The *Ogygia Guettardi* Brong. was reproduced by Oehlert in Palæontologia Univ.

Bolton (Herbert). On the occurrence of a Trilobite in the Skiddaw Slates of the Isle of Man.

Geol. Mag., Dec. iii, vol. 10, 1893, pp. 29-31.

Æglina or Asaphus.

See also Mem. Geol. Sur. United Kingdom, The Geol. Isle of Man, 1902, p. 93.

Bigney (Andrew J.) A new bed of Trilobites.

Indiana Acad. Sci. Pro., 1910, p. 139-1911.

Records the discovery of Calymmene bed in Richmond formation.

Bolton (H.) On faunal horizons in the Bristol Coalfield.

Quart. Jour. Geol. Soc. London, vol. 67, p. 316, 1911, pl. 27.

Palæontological Notes, Ostracoda and Phyllopoda, on p. 324.

The author figures the following species:

Estheria tenella Jordan, *Bairdia* cf. *amplex* Reuss, *Leaia Leidyi* Lea, var. *salteriana* Jones.

Bonnema (J. H.) Beträge zur Kenntniss der Ostrakoden der Kuckersschen Schicht.

Mitteilungen aus dem Min. Geol. Inst., vol. 2, part 1, Leipzig, 1909, 84 pp. with 8 plates.

The author gives the literature of this family, and describes and figures the following genera and species:

Primitia Tolli nov. sp., *P. Molli* nov. sp., *P. dentifera* nov. sp., *P. rossica* nov. sp., *P. decumana* nov. sp., *P. Kuckerstana* nov. sp., *P. Kapteyni* nov. sp., *P. Esthonica* nov.

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sp. *Primitiella Kuckersiana* nov. sp. *Tetradella Calkeri* nov. sp.; also *convexa* n. sp. et nov. var. *Ctenobolina carinata* Krause, *C. Kuckersiana* nov. sp. *Ceratopsis Schmidti* n. sp., *C. cornuta* Krause. *Strepula Kuckersiana* nov. sp., also var. *acuta*. *Ulrichia* cf. *bidens* Krause, *U. Kuckersiana* n. sp. *Macronotella Kuckersiana* nov. sp. *Bollia minor* Krause var., *Kuckersiana* nov. var., also var. *robusta*. *Bollia ornata Krause*, also var. *latimarginata* nov. var., *B. granulosa* Krause. *Entomis oblonga* Steusloff var., *Kuckersiana* nov. var., *E. variolaris* nov. sp., *E. obliqua* Krause var. *Kuckersiana* nov. var., *E. flabellifera* Krause, *E. quadrispina* Krause. *Cytherellina Ulrichi* nov. sp., *C. Jonesii* nov. sp., *C. Krausei* nov. sp., *C. Ruedemanni* nov. sp. *Leperditia (Cypridina) ovulum*, referred to *Primitia Tolli* n. sp. *Leperditia minuta* Eichw., referred to *Cytherellina Ulrichi* n. sp. *Beyrichia obliquejugata* Schmidt to *Ceratopsis* sp. *Beyrichia complicata* Salter, referred to *Tedradella Kuckersiana* n. sp., *B. stangulata* Salter to *Bollia minor* Kr. var. *Kuckersiana, B. strangulata* var., *B. Jones* to *Bollia ornata* Kr. or *Entomis*.

Bornemann (J. G.) Die Versteinerungen des Cambrischen Schichen systems der Insel Sardinien.

N. Act k. Leop. Carl d. Acad. d. Natur., vol. 56, No. 3, 1891.

Under the new generic name of Olenopsis the author includes a genus which differs from Olenus in the form of its small, rounded pygidium with an unjointed axis; the head is semicircular in front and not straight as in Olenus; it has also a conical smooth glabella, with 14 or 15 thorax segments.

The genus has been referred by Frech *Lethaea geognostica*, I Theil. *Lethaea palaeozoica*, 2 Bd., I Lieferung, p. 41, to *Olenellus* sub. genus *Holmia*.

The author describes *Olenopsis Bornemanni* n. sp., *O. Zoppii Menegh.*, *O. longispinatus* n. sp., *O. micruroides* n. sp., and *O. maximus*.

Metadoxides torosus Menegh. n. gen. et sp.

This genus is similar to *Paradoxides* with numerous thoracic segments and a small pygidium. The head is short and wide; the front margin nearly straight; the glabella is similar to that of the Olenidae, and has three oblique furrows, which do not extend to the center.

Metadoxides armatus Menegh., *M. Bornemanni* Menegh., *M. arenarius* n. sp.

Matthew, in Studies on Cambrian Fauna, No. 3, p. 87, classifies the genus *Metadoxides* as follows:

1—Species having a widely expanded front to the cephalic shield; somewhat prolonged eye lobes; short posterior extension of the dorsal suture. No costae on the side lobes of the pygidium.

Catadoxides n. subgen., type *C. magnificus* Matt.

2—Species having a compacted front to the cephalic shield, short eye lobes, prolonged posterior extension to the dorsal suture.

a—No costae on the side lobes of the pygidium.

Metadoxides sen stric., type *M. torosus*.

b—One or more pair of costae on the side lobes of the pygidium.

Anadoxides n. subgen., type *A. armatus*.

The following species are also included in Bornemann's paper:

Paradoxides Gennarii Menegh., *P. asper* n. sp., *?P. ingens* n. sp., *?P. bifidus* n. sp., *? Paradoxides* sp. *Olenellus solitarius* n. sp.

? Peltura inflata n. sp. *Ptychoparia laticops* n. sp., *? P. Adamsi* Bill., *P. enantiopa* n. sp. *Sao sarda* n. sp. *Meneghinella* n. gen., *M. serrata* n. sp.

The glabella has four cross furrows, with a center row of spines.

Arionellus ? dubius n. sp., *A. zancanthoides*. *Anomocare arenivagum* Menegh. *Neseuretus? discurus* n. sp. *Giordanella* n. gen.

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The species of this genus resembles in structure of the thorax those of *Illaenus*, from which they differ by the more arched axis, and the side spines of the pygidium.

Angelina differs from *Giordanella* in its flat head, and the margin around it; also in the size of its pygidium.

Giordanella Meneghinii Bormen., *G. dilatata* n. sp., *G. elongata* n. sp.

Boulay (M. L'abbe). Sur un nouveau genre de Trilobite dans le terrain. Houiller du nord de la France.

Ann. Sci. Bruxelles, 4 Anne, 1879-80, Memori, p. 277-280.

Under the new generic name of Anthracopeltis, the author describes and illustrates a pygidium as *Anthracopeltis Crepini.*

The pygidium resembles that of Phaeton Barrande, but may be distinguished by the shape of the axis, also by a groove which runs around the tail near the base of the spines.

Boule (M.) Sur des debris d'Arthropleura trouvés en France.

Bull. de la Soc. de l'Industrie Minerale, 3rd ser., tome 7, 4 livr, 1893, pp. 619-638, plates 54-55.

Brodie (P. B.) On the Passage beds in the neighbourhood of Woolhope, Herefordshire, and on the discovery of a new species of Eurypterus and some new Land plants in them.

Geol. Mag., Decade 1, vol. 8, 1871, p. 230.

The author describes as the passage beds between the Silurian and Old Red sandstone formation near Woolhope, a series of shales and sandstones. The Olive shales contain several crustacean fossils, including *Pterygotus Banksii,* and a new Eurypterus named by Henry Woodward *Eurypterus Brodiei.*

Branson (E. B.) The fauna of the residuary Auburn Chert of Lincoln County, Missouri.

Trans. Acad. Sci. of St. Louis, vol. 18, No. 4, 1909, pp. 39-49, pl. 7.

The author describes as new *Pterygometopus Lincolnensis,* which differs from *P. eboraceous* in the absence of genal spines, and slightly in the shape of the first lateral furrow of the glabella from *P. intermedius* Walc., which he figures on pl. 8, fig. 20.

Brögger (W. C.) Ueber die Verbreitung der Euloma Niobe Fauna.

Nyt. Mag. Natv., vol. 35, 1896, pp. 164-240.

The author refers to the new genus *Dikelokephanina.*

Centropleura dicraeura Ang. *Dikelocephalus furca* Salt. *Asaphelina Barroisi* Mun-Chalm et Berg. and *Dictyocephalites Villebruni* Berg., to this genus.

Under the new genus Apatokephalus, the author places *Tril serratus* S. & B. *Centropleura angusticauda* Ang. (probably a variety of Apatokephalus serrata Brögg., p. 21).

Dik. finalis Walc., *D. Schlotheimi* Bill. *(Remopleuridesi Schlotheimi* Bill., 1865.) *Dikelocephalus Magnificus Conocorphyhe invita,* Salter.

Bureau (L.) Notice geol. sur Loire Inférieure, 1900.

The author gives a fig. 23 of *Calymmene pulchra* Barr.

Bezier refers it to *Prionocheilus Verneuili* Rouault.

Burling (L. D.) The Albertella Fauna in the Middle Cambrian of British Columbia.

Am. Jour. Sci., 4th ser., vol. 42, 1916, p. 469.

Albertella Bosworthi and *A. Helena* Wal.

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Burr (Henry T.) A new Lower Cambrian fauna from Eastern Massachusetts.

Am. Geol., vol. 25, 1900, pp. 41-50.

The fossils described from a red slate and impure limestone from North Weymouth, Mass.

Olenellus (Holmia) *bröggeri* Walc., *O. (Mesonacis) asaphoides* Emm. *Olenellus* sp. *Metadoxides magnificus* Matt. *Agraulus (Strenuella) strenuus* Bill. var. *nasutus* Walc. *Microdiscus* cf., *M. Helena* Walc. *Leperditia* cf., *L. solitaria* Barr.

Burhenne (H.) Fauna d. Tentaculitenschiefer in Lahngebiet bes d. Schiefer v. Leun bei Braunfels, 1899.

Proetus laevigatus and *granulosus*, pl. 1, fig. 1-6; *Proetus Holzapfeli* referred by Richter to *P. cornutus*.

Cyphaspis hydrocephala Roemer.

Calman (W. J.) On *Pleurocaris* a new Crustacean from the English Coal Measures.

Geol. Mag., Decade v, vol. 8, 1911, p. 156. Fig. in text.

Pleurocaris annulatus g. et sp. n.

The specimen is without a carapace, with at least 7 of the thoracic somites distinct and provided with horizontally expanded pleural plates; with at least 7 pairs of the thoracic appendages, not greatly differing in size; with the abdomen longer than the thorax; with the telson and uropods forming a tail fan—the former distinct from the last somite and tapering to a sharp point, the latter with long, narrow rami.

Acanthotelson Simpsoni Meek and Worthen

The author includes the genus in Syncarida allied to the genus *Acanthotelson* Meek and Worthen.

Calman (W. T.) On some Crustacea of the division Syncarida from the English Coal Measures.

Geol. Mag., Decade v, vol. 8, No. 11, 1911, pp. 488-495, figures 1-5.

The author regards the genus Preanaspides Woodward, as a synonym of Palæocaris Meek and Worthen.

Figures and describes *Palaeocaris praecursor* H. Woodw., also *Palaeocaris typus* after Packard's figure of the species.

The author also gives some additional notes regarding *Pleurocaris annulatus*, with a figure of the restoration of dorsal surface of the head region.

Calvin (Samuel). Description of *Asaphus susae*. Calvin in MS.

Whitfield Geol. Wisconsin, vol. 4, p. 236, pl. 5, fig. 3, and pl. 10, fig. 8, from the Trenton Group.

——— Description of *Isotelus florencevillensis* n. sp.

Iowa Geol. Sur., vol. 13, 1902, p. 46, foot-note, from the Maquoketa or Hudson River shales.

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This is the rather short and broad trilobite, with rounded cephalon and pygidium, which Clarke Geol. Pal., vol. 3, part 2, p. 708, referred to *Isotelus susae.*

Cardot (H.) and **Legendre** (R.) Nouvelles traces d'autotomie chez des Crustaces fossiles.

Bull. Mus., Paris, 1912, pp. 131-132.

Carruthers (William). Note on some supposed fragments of a Eurypterus in Dr. Henry Woodward's British Fossil Crustacea Merostomata.

Mon. Palaeont. So., pp. 168-71.

The author remarks that the specimens figured and described by Salter as portions of a Eurypterus, are fragments of a large Equisetaceous plant.

Chapman (Frederick). On a new species of Leperditia from the Silurian of Yaas, New South Wales.

Proc. Roy. Soc. Victoria, vol. 22, pp. 1-5, plates 1 and 2.

Leperditia shearsbii nov.

——— New or little known Victorian Fossils in the National Museum, Part XIV. On some Silurian Trilobites.

Proc. Roy. Soc. Victoria, vol. 24, 1912, pp. 293-300, plates 61-63.

The author describes:

Ampyx parvulus Forbes var. *Jikaensis* nov., *A. yarraensis* nov. *Illaenus jutsoni* nov. The Victorian species differs in ornamentation of the glabella from *Illaenus Davissi.* It has a narrow and rounded median ridge, extending along the summit of the glabella, tapering off into a mere thread before reaching the anterior margin.

Encrinurus (Cromus) spryi nov. *Homalonotus vormer* nov.

——— New or little known Victorian Fossils in the National Museum, Part XVIII. Some Yeringian Trilobites.

Proc. Roy. Soc. Victoria, vol. 28, 1915, pp. 157-171, plates 14-16.

The author includes eleven species of Trilobites in this paper:

Goldius greenii nov., which he compares with *Bronteus oblongus* Corda. *Goldius Cresswelli* nov. *Proetus euryceps* McCoy. *Cyphaspis Browningensis* Mitchell, *C. Lilydalensis* nov. of the *Cyphaspis Burmeisteri* type, *C. yassensis* E. & M. *Calymmene angustior* nov.

Compares *C. tuberculosa* and other species.

The lateral riblets of the pygidium in *C. angustior* are furrowed or bifurcated distally, but in *C. tuberculosa* they are simple. *Calymmene Blumenbachi* Brong. Refers *C. duplicata* (Murch.) Jenkins, 1879, p. 27, pl. 6, fig. 4, to this species.

Cheirurus Sternbergi Boeck. *Phacops Crossleii* E. & M., *P. serratus* Foerste.

Chevillard (J. L.) Trilobites du Devonien du Mount de la Revenue.

Bull. Soc. Geol. de France, 2d ser., vol. 24, 1866-67, pp. 124-126.

Not descriptive.

The author remarks that *Phacops laevis* Münst. is very much like *Phacops cryptophthalmus* Emmrich.

Chmielewski (Czeslaw). Die Leperditien der obersilurischen Geschiebe des Gouvernement Kowno und der Provinzen Ost und Westpreussen.

Phys. ökonomischen Ges zu Köningsberg, 1900, 37 pp., 3 plates.

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The author describes the following species:

Leperditia Hisingeri Fr. Schmidt var., *angulata* Lebedew, *L. lithuanica* n. sp. and var. *intermedia, L. Dossi* n. sp., *L.-Hisingeri* var. *abbreviata* Schmidt, *L. baltica* His., *L. phaseolus* His. Stammform, *L. phaseolus* His. var. *Angelini* Schmidt, also types and var. *lata* n. var., *L. phaseolus* His. var. *ornata* Eichw., included under Group A.

His. Group B, includes *Leperditia gregaria* Kiesow and var. *coccinnella* n. var., *Leperditia gregaria* var. *tumulosa* n. var. and var. *conoidea* n. var. with var. *seimgalliensis* n. var. *Leperditia Schellwieni* n. sp., *L. gigantea* Roemer and var. *Poniewieshensis* n. var. *Leperditia* sp. cf. *tyraica* Schmidt. *Leperditia Keyserlingi* Schmidt and *L. baltica* var. *Eichwaldi* Schmidt.

Clarke (J. C.) Relation of the Palæozoic Arthropods to the Strandline.

Bull. Geol. Soc. America, vol. 22, No. 2, pp. 279-280, 1911.

Clarke (John M.) Notes on some Crustacea from the Chemung Group of New York.

49th Ann. Report N. Y. Museum, vol. 11, 1895, pp. 729-738.

Pephicaris horripelta n. gen. et sp. *Bronteus serescens* n. sp.

——— The stragraphic and faunal relations of the Oneonta sandstone and shales, the Ithaca and Portage Groups in Central New York.

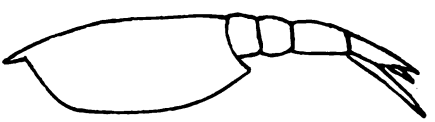
49th Ann. Report N. Y. Museum, vol. 11, 1895, Part 2, p. 69, fig.

Rhinocaris ? bipennis n. sp.

——— Upper Silurian fauna of the Rio Trombetus, State of Para, Brazil, and Devonian Mollusks from the State of Para.

Archiv. Mus. Nacional, Rio de Janeiro, vol. x, 1899.

Primita minuta, Eichw. *Bollia lata,* Vanuxem.



Rhinocaris Columbina

——— *Eucrustacea* (pars) *acerta.*

Text Book of Palæontology by A. von Zittel. Translated by Charles R. Eastman, London and New York, 1900, pp. 639-658.

——— The Oriskany fauna of Becaft Mountain, Columbia Co., New York.

Memoirs New York State Museum, vol. 3, No. 3, Albany, 1900, 9 plates.

Dalmanites (Synphoria) stenmatus n. sp., *D. (Synphoria) stemmatus* var. *convergens* n. var. *D. phacoptyx* H. and C., *D. bisignatus* n. sp. *Phacops correlator* n. sp., *P. Logani* Hall. *Cordania becraftensis* n. sp., *C. Hudsonica* n. sp. *Cyphaspis minuscula* Hall. *Proetus Conradi* Hall. *Acidaspis tuberculata* Conrad. *Lichas* cf. *pustulosus* Hall. *Homalonotus* sp. *Beyrichia* sp.

——— Appendix 3. Notes on Palæozoic Crustaceans. The genus *Pseudoniscus* in the *Eurypterus* beds below and above the Gypsum and Salt beds of the Salina stage in New York.

Ann. Report State Palæontologist, 1900.

Pseudoniscus Roosevelti n. sp.

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CLARKE (J. M.)—Continued.

——— Phyllocardia from the Black shales at the base of the Salina beds in Western New York.

Ann. Report State Palæontologist, 1900, pp. 92-110.
Ceratiocaris (Limnocaris) praecedens n. sp. *Emmelezoe decora* n. sp.

——— The occurrence of the Phyllopod Crustacean *Estheria membranea* of the Old Red Sandstone of Northern Scotland and Northwestern Russia in the Oneonta.—Catskill sediments of Eastern New York.

Ann. Report State Palæontologist, 1900, pp. 103-110, plate 4.
Estheria Ortoni n. sp.

——— Limestone of Central New York interbedded with bituminous shales of the Macellus, with notes on the nature and origin of their faunas.

Bull. N. Y. Museum, vol. 49, 1901, pp. 115-138, plate 8.
Not descriptive. List of Fossil Crustacea.

——— and Ruedemann (R.) Guelph fauna in the State of New York.

N. Y. State Museum, Mem. 5, 1903.
The authors describe and illustrate *Leperditia balthica* Hisinger var. *guelphica* Jones. *Calymmene niagarensis* Hall; also a species of Dalmanites and Proetus.

——— Percé: A brief sketch of its geology.

Bull. New York Mus., No. 80, pp. 134-171, 1905.
Represents an incomplete cephalon of *Dicranurus limenarcha*, on p. 153.

——— some new Devonic Fossils.

Bull. 107, N. Y. State Mus. Geological Papers, 1907, pp. 153-291.
Trilobites: *Dalmanites griffoni* n. sp., fig., *D. coxius* n. sp., fig., *D. dolbeli* n. sp., fig., *D. Lowi* n. sp., fig., *D. perceensis* n. sp., fig., *D. Veiti* n. sp., fig., *D. Whiteavesi* n. sp., fig., *D. Gaveyi* n. sp., fig., *D. ploratus* n. sp., fig., *D. (Probolium) Bairdi* n. sp. fig., *D. (Probelium) Esnoufi* n. sp., fig. *Phacops Logani* var. *gaspensis* n. sp., fig., *P. (Phacopidella) Mylanderi* n. sp., fig. *Bronteus Barrandii*, Hall, var. *major*, fig. *Lichas (Gaspelichas) forillonia* n. sp., fig., *L. bellamicus* n. sp., fig. *Ceratocephala robinia* n. sp., fig. *Cordania gasepiou* n. sp., fig.

——— The Eurypterus shales of the Shawangunk Mountains in Eastern New York.

Bull. 107, N. Y. State Mus. Geological Papers, 1907, pp. 295-310, 8 plates.
Eurypterida: *Eurypterus maria* n. sp., *E. myops* n. sp., *E. ? cicerops* n. sp., *E. ? cestrotus* n. sp.
Genus Hughmilleria *H. shawangunk* n. sp.
Genus Pterygotus *P. ? otisius* n. sp. *Stylonurus* sp. Phyllocardia.

——— Early Devonic History of New York and Eastern North America.

N. Y. State Mus., Men. 9, pt. 1, 366 pp., 48 plates, 1908.
Fauna of the St. Alban beds; *Phacops logani* Hall. *Dalmanites griffoni* nov., *D. coxius* nov. *Bronteus barrandii* Hall. *Cordania cyclurus* Hall and Clarke.

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CLARKE (J. M.)—Continued.

Fauna of the Grade Greve Limestones. *Phacops logani* Hall and var. *gaspensis* nov. *Dalmanites micrurus* Green, *D. dolbeli* nov., *D. lowi* nov., *D. veiti* nov., *D. Whiteavesi* nov., *D. perceensis* nov., *D. emarginatus* Hall, *D. gaveyi* nov., *D. (Probolium) bairdi* nov., *D. (P.) esnoufi* nov., *D. phacoptyx* H. & C.

Proetus phocion Billings. *Cordania becraftensis* Clarke, *C. gasepion* nov. *Lichas bellamicus* nov. *Lichas (Gaspelichas) forillonia* nov. *Ceratocephala robinia* nov. *Aparchites* nov. *Bythocypris* sp. nov. *Phacops (Phacopidella) correlator* Clarke.

——— Early Devonic History of New York and Eastern North America.

N. Y. State Mus., Mem. 9, part 2.

The author illustrates *Dalmanites micrurus* Green Proetus sp. *Bronteus Barrandii* Hall. *Pterygotus* sp. from the Dalhouse Beds.

From the Moose River sandstone the following Crustacea:

Homalonotus cf. *vanuxemi* Hall. *Dalmanites pleuroptyx* Green, *D. ploratus* Clarke Dalmanites sp.

From the Chapman sandstone: *Phacops (Phacopidella) mylanderi* Clarke. *Homalonotus vanuxemi* Hall. *Dalmanites* cf. *micrurus* Green.

New York Oriskany *Dalmanites emarginatus* Hall.

——— and Ruedemann (Rudolf). Mode of life of the Eurypteridae.

Science, new ser., vol. 32, p. 224, Aug. 12, 1910.

——— and Ruedemann (Rudolf). The Eurypterida of New York.

Memoir 14, New York State Museum, vol. 1, Text vol. 2, plates, 1912, 638 pp., 88 plates, 121 text figures.

Reviewed in Am. Jour. Sci., vol. 35, No. 208, 1913, p. 458.

The reviewer remarks (Schuchert): "It is truly a monumental work and a model for all palæontologists to follow."

In this work one can study Eurypterida from any view point permitted the palæontologist. Here we find their chronology, their development from baby stages, prophetic of unknown ancestors, to adults; and their relations to scorpions, horseshoe crabs, Trilobites and even to hypothetic annelids.

The authors illustrate in text and plates the following species:

Strabops thacheri Beecher.

Eurypterus.

The American species of Eurypterus readily fall into three subdivisions:

(A) Those that groups themselves around *E. remipes.*

(B) Those that vary in different directions from this group, but are approximately contemporary—E. Dekayi, etc.

(C) The later Carbonic species.

Under this genus the authors describe:

Eurypterus remipes DeKay, *E. lacustris* Harlan, *E. lacustris* Hall var. *pachychirus* Hall, *E. DeKayi* Hall, *E. maria* Clark. This species differs from American congeners, due to the terete form of the body that apparently is without preabdominal expansion.

Eurypterus pygmaceus Salter differ but slightly. *Eurypterus megalops* nov., *E. microphthalmus* Hall. The authors refer *E. eriensis* Whitfield, to this species. *Eurypterus pittsfordensis* Sarle, *E. (Dolichopterus ?) prominens* Hall, *E. pustulosus* Hall. Authors refer *E. giganteus* Pohlman and *E. globicaudatus* Pohlman to this species. *Eurypterus pristinus* nov., *E. ranllarva* nov., *E. ? (Dolichopterus ?) stellatus* nov., *E.*

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CLARKE (J. M.) and RUEDEMANN (R.)—Continued

(Onychopterus) Kokomoensis Miller and Gurley. This is subgenus proposed for this species.

The authors classify *Eurypterus Boylei* Whiteaves under a new subgenus *Tylopterus.*

Eurypterus (Anthraconectes) mazonensis Meek and Worthen. *Eusarcus* Grote and Pitt. *Eusarcus scorpionis* Grote and Pitt. The authors refer *E. grandis* G. & P. to this species. *Eusarcus newlini* Claypole. The authors refer *Eurysoma newlini* and *Carcinosoma newlini* Claypole to this species. *Eusarcus ? cicerops* Clarke, *E. ? longiceps* nov., *E. triangulatus* nov. *Dolichopterus macrochirus* Hall, *D. frankfortensis* nov., *D. latifrons* nov., *D. otisius* Clarke, originally described under the genus pterygotus; *D. siluriceps* nov., the *Eusarcus scorpionis* Pohlman, 1886, *D. testudineus* nov., *D. stylonuroides* nov.

Genus *Stylonurus* Page The authors illustrate *S. elegans* Laurie and *S. logani* Woodward, also *S. macrophthalmus Laurie.* They divided the genus into subgenera.

(A) Stylonurus type *S. logani* Woodward, etc.

(B) Ctenopterus type *Stylonurus cestrotus* Clarke, etc.

(C) Tarsopterus type *S. scoticus* Woodward.

Stylonurus (Ctenopterus) excelsior Hall. .....

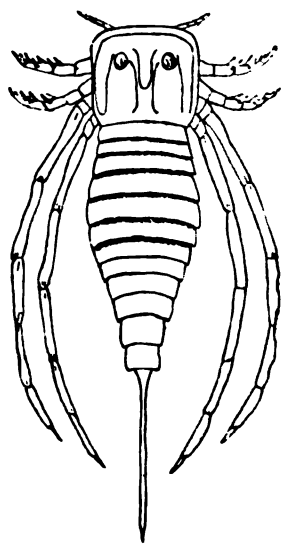
The author refers *Dolichocephala lacoana* Claypole, 1883, and *S. lacoanus* Beecher, 1900, to this species.

(Drepanopterus) type *S. lobatus* Laurie.

Stylonurus limbatus nov., *S. (Ctenopterus) multispinosus* nov., *S. myops* Clarke. *Stylonurus beecheri* Hall, described as *Eurypterus beecheri,* Hall, 1884; *S. wrightianus* Dawson, described as *Equisetides wrightiana* Dawson, 1881. Subgenus *Drepanopterus* Laurie. The authors figure *D. pentlandicus* Laurie, *D. longigaudatus* nov.

Echinognathus Walcott, *E. clevelandi* Walcott.

Megalograptus Miller, *M. welchi* S. A. Miller. This was described as a Graptolite by Miller, 1874.



Stylonurus Logani Woodward

Family Pterygotidae:

Genus *Hughmilleria* Sarle, 1902, *H. socialis Sarle* and var. *robusta, H. magna* nov., *H. shawangunk* Clarke.

Pterygotus Agassiz:

The authors figure a restoration of *Stylonurus poweiei* and *Pterygotus angelicus,* fig. 70. Describe and illustrate *Pterygotus macrophthalmus* Hall, to which they refer *P. osborni* Hall, *P. atlanticus* nov., *P. buffaloensis,* Pohlman emend. The authors refer *P. cummingsi* Grote and Pitt, 1877, *P. acuticaudatus* Pohlman, 1881, *P. quadraticaudatus* Pohlman, *P. macrophthalmus* Pohlman, 1881, and *P. bilobus* (Huxley and Salter) Pohlman, 1881, to this species. *Pterygotus cobbi* Hall, *P. (Erettopterus) globiceps* nov., *P. (Erettopterus) gandis* Pohlman emend.

This is the *Ceratiocaris grandis* Pohlman, 1883, *P. monroensis* Sarle, *P. (Eusarcus) nasutus* nov., *P. prolificus* nov.

Remarks on *Beltina danai* Walcott.

The authors are not convinced that the fragments of this genus described are those of merostomatus.

Note on *Proscorpius osborni* Whitfield.

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CLARKE (J. M.) and RUEDEMANN (R.)—Continued

The authors remark that Eusarcus and the Siluric scorpions are so much alike in their body form, they may be assumed to have had similar habits.

The genus *Hastimima* White, 1909.

This genus was established for a few carbonic plants from Brazil. Seward, 1909, and Woodward refer similar fragments to the Eurypteridae. The authors give figures of *Hastimima whitei.*

Note on *Sidneyia inexpectans* Walcott.

The authors remark that the suborder Limulava differs from the Eurypteridae, to which it is most nearly related, in having a large epistoma similar to that of the Trilobita.

Eurypterids from the Normanskill shale of New York.

Eurypterus chadwicki nov. *Eusarcus linguatus* nov. *Dolichopterus breviceps* nov. *Stylonurus modestus* nov. *Pterygotus (Eusarcus) nasutus* nov., *P. normanskillensis* nov.

The authors give notes on the Eurypterids from the Shawangunk grit of the Delaware Water Gap, Pennsylvania, and describe as new *Eusarcus vaningeni* from the Salina formation.

Notes on Anthraconectes.

The authors investigated the types of C. E. Hall and James Hall, Pennsylvania Carbonic species, now in Chicago Univ., and make some notes on *Eurypterus (Anthraconectes) mansfield* C. E. Hall, *E. pennsylvanicus* C. E. Hall.

The volume closes with a note and figure on the ventral surface of the cephalothorax of Hughmilleria, and a note on *Pterygotus Cobbi* var. *juvenis* nov.

——— A notable Trilobite from the Percé rock.

New York State Museum Bull. 164, 1913, p. 138.

The author illustrates Plate *A. Homalonotus perceensis.*

——— Illustrations of the Devonian fossils of Southern Brazil and the Falkland Islands.

New York State Museum Bull. No. 164, 1913, p. 140.

The author illustrates the following Trilobites:

Homalonotus noticus Clarke, *H. (Schizopyge) parana* Clarke, *H. herscheli* Murch. *Dalmanites acacia* Schwarz.

Calmonia new genus, *C. ocellus* Lake, *C. subseciva* Clarke, *C. signifer* and variation, *micrischia* Clarke. Proboloides new genus, *P. cuspidatus* Clarke and *P. pessulus* Clarke.

Pennaia new genus, *P. pauliana* Clarke. *Cryphaeus allardyceae* Clarke, *C. australis* Clarke. *Dalmanites falklandicus* Clarke, *D. accola* Clarke. *Homalonotus perceensis* Clarke.

——— Fosseis Devonianos do Paranä.

Service Geol. E. Mineralogico do Brazil, vol. 1, 1913.

The author illustrates and describes the following Trilobites:

Homalonotus noticus nov. (a Falkland Island species), *H. Herscheli* Murchison, *H. (Schzopyge) parana* nov. *Dalmanites accola* nov., *D. Falklandicus* nov., D. sp. *Cryphaeus australis* nov., *C. allardyceae* nov., C. sp.

Group Mesembria—*Dalmanites acacia* Schwartz.

This is the *Phacops crista galli* Lake, 1904, which Schwartz Record, Albany Mus., 1906, refers to *Phacops acacia. Dalmanites africanus* (Salter) Lake.

Calmonia gen. nov. type, *C. signifer* nov.

In 1889 Oehlert introduced the name of Cryphina as a generic name for a Devonic species for a triangular, highly convex dalmanitid pygidium, having a series of five or more broad, closely appressed small spines on each side. Similar forms described for

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CLARKE (J. M.)—Continued.

New York Devonic as *Dalmanites concinna* var. *serrula* in 1888, and referred to *Cryphina serulla.*

The author in view of the known variation between Cryphaeus and Hausmannia places the new genus with a caudal extension in his new genus. The head differs from that of Cryphaeus. The author describes in addition to the type *Calmonia signifer* var. *micrischia* nov., *C. subseciva* nov. and *C. ocellus* Lake, described by Lake under the genus Phacops from South Africa. *C. ? gonzana* Clarke.

Pennaia new genus type, *P. pauliana* nov.

A very distinct variation of the Mesembria type of Dalmanites is expressed by *Pennaia pauliana.* In general aspect it is distinctly more Phacopidean than Calmonia, in respect: first, to the head, in which all parts are more compact and condensed; second, in the thorax, where the axis is relatively much broader than the side lobes, while the ends of the anterior segments are rounded rather than lanceolate; third, in the pygidium, which is phacopidean in its small size and sparse segmentation. The margin of the pygidium is fimbriate, bearing three flattened spinules on each side.

Proboloides gen. nov. type. *P. cuspidatus* and *P. pessulus* nov.

In the possession of a frontal snout on the head this species is a Probolium after the type of snouted Dalmanitids, but in respect to the character of the snout, the form of the cephalon, its style of lobation and smoothness of surface, it departs from the type and is an expression of the Mesembria structure.

The author proposed the term Phacopina in place of Phacopidella, which Reed uses for Acaste, a preoccupied term.

——— and **Swartz** (Charles K.) Trilobita.

Geol. Sur. Maryland Upper Devonia, Baltimore, 1913, p. 699.

Phacops rana Green, 1832.

——— Report of Director, 1913.

New York State Mus. Bull. 173, 1914.

Restoration of *Pterygotus buffaloensis,* also of Eusacus and that of *Stylonurus excelsior.*

Cleland (Herdman F.) Further notes on the Calciferous (Beekmantown) formation of the Mohawk Valley, with descriptions of new species.

Bull. Am. Palæontology IV, No. 18, 1903, pp. 37-50, plates.

Bathyurus ellipticus nov. sp. *Harrisia parabola* nov. sp.

Crossmann Rev. Crit. Palæont., replaces the preoccupied named of Harrisia to that of Clelandia.

———The fossils and stratigraphy of the Middle Devonic of Wisconsin.

Wisconsin Geol. and Nat. Hist. Sur. Bull. 21, 1911. Chapter X, Crustacea.

The Middle Devonic formation in Wisconsin has yielded very few crustacean remains. The most widespread trilobite is *Phacops rana.*

The author describes and illustrates *Proetus Rowi* Green. *Phacops rana* Green. *Proetus crassimarginatus* Hall.

Ostracoda: *Bollia ungula* Jones. *Barychilina walcotti* Jones. *Kirkbya subquadrata* Ulrich. *Ulrichia conradi* Jones.

Phillopocarida: *Echinocaris punctata* Hall, and Tropidocaris sp.?

——— A study of the fauna of the Hamilton formation of Cayuga Lake section in central New York.

Bull. U. S. Geol. Sur., No. 206, 1903, 112 pp., 5 plates.

The author gives a list of Crustacea on pp. 79-81, with notes on their occurrence.

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Cobbold (E. S.) On some small Trilobites from the Cambrian Rocks of Comley, Shropshire.

Quart. Jour. Geol. Soc., vol. 66, No. 261, pp. 19-50, plates 3-8.

Microdiscus comleyensis n. sp.

This species appears to be somewhat intermediate between *M. speciosus* Ford and *M. punctatus* Salter, but only has 7 annulations in the axis of the pygidium.

Microdiscus lobatus Hall, *M. Helena* Walcott, *M. speciosus* Ford. *Ptychoparia ? Attleboroughensis* Sjö. and F., *P.? annio* n. sp. *Micmacca ? ellipsocephaloides* n. sp. cf., *M. recurva* Matthew. *M. ellipsocephaloides* var. Spinora and var. *strenuelloides* and var. *senior, M. ? parvula* n. sp. *Agraulos (Strenuella) salopiensis* n. sp. *Anomacare platycephalum* n. sp., *A. parvum* n. sp., *A. ? pustulatum* n. sp. *Protolenus latouchei* n. sp., *P. morpheus* n. sp. *Mohicana* n. gen.

This new genus has characters very similar to those of *Micmacca ? plana* Matthew, which that author referred provisionally to his genus.

Mohicana lata n. sp., *M. clavata* n. sp.

The author remarks these two species have many points of resemblance with *Micmacca ? plana* Matthew, also with *Avalonia manuelensis* Walcott; but the peculiar groove on the line of the ocular ridge are absent, and the frontal limb is more extended.

——— Report of the Geological Excavation Committee of the British Association, read at the Dublin Meeting, 1908.

Rep. Brit. Assoc., 1908, Dublin, 1909, pp. 241-42.

Microdiscus sp. *Anomocare* cf. *Agraulos strenuus* var. *nasutus* Walc. *Anomocare* sp. 1 and 2, also 3, *Anomocare* vel. *Agraulos* sp. *Protolenus* sp.

——— Trilobites from the Paradoxides beds of Comley, Shropshire.

Quart. Jour. Geol. Soc. London, vol. 67, No. 267, 1911, pp. 282-311, plates 23-26.

The author describes *Paradoxides Groomi* Lapworth from the type specimen, and figures it for the first time; also *Paradoxides* sp. indet., *P. Davidis* Salter, *P. rugulosus* Corda. *Conocoryphe emarginata* Linnarsson var. *longifrons* nov. *Dorypyge Lakei* sp. nov. This species is nearly allied to the pygidae of *Dorypyge oriens* Grönwall.

The species might be compared with *Dikellocephalus Marcoui* (Whitfield) from Georgia, Vermont; see, also, Walcott's figures of this species.

Agnostus fallax Linnarsson, *Microdiscus* sp. cf., *M. punctatus* Salter. *Agraulos holocephalus* Matth., *A.* sp. cf., *A. quadrangularis* Whitf.

The author follows Reed's classification of the genus *Ptychoparia* Corda, and places the genera *Ptychoparia Liostracus* and *Conocephalites*, under subgenera to *Ptychoparia*.

The author describes *Ptychoparia (Liostracus) pulchella* sp. nov., nearly related to *Liostracus validus* Matth. and *L. Linnarssoni* Brögger, but differ from both in the relative length of the glabella. *Ptychoparia (Liostracus)* sp. ident. two forms and *P. (Liostracus) dubia* sp. nov.

——— The Trilobite fauna of the Comley Breccia-Bed, Shropshire.

Quart. Jour. Geol. Soc., vol. 59, No. 273, pp. 27-50, plates 2 and 3.

The author describes and illustrates *Paradoxides intermedius* nov.

The species differs but slightly from *P. Hicksii*, its var. *palpebrosus* Linnarsson and *P. Sjögreni* in the course of the facial suture and general form.

Agraulos sp. cf., *A. Quadrangularis* Whitfield. Subgenus *Strenuella (Agraulos)* sp. indet. *Conocoryphe aequalis* Linnrs., *C. bufo* Hicks. subgenus *Liocephalus impressa* Linnrs. *Dorypyge reticulata* nov.

The cranidia of *D. Lakei* is very much like the new species, but the thorax and pygidia are different, and the reticulate character of the test very distinctive.

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Microdiscus punctatus Salter. *Ptychoparia (Liostracus) lata* nov.

The species is related to *P. valida* Matthew and *P. Linnarssoni* Brögger. *Ptychoparia (Liostracus)dubia* Cobbold.

Cole (A. J.) On *Belinurus kiltorkenis* Bailey.

Geol. Mag., Decade 4, vol. 4, 1901, pp. 52-54, figures.

Collie (George). Lower Ordovician section, near Bellefront.

Bull. Geol. Soc. Am., vol. 14, 1903, pp. 407-420, plate 59.

Brongniartia Trentonensis Simpson.

The generic name of Brongniartia was used as a subgenus to Homalonotus by Salter in 1865; also by Green Mong. Tril., 1832, for a species of Homalonotus; and by Eaton, Am. Jour. Sci., vol. 22, 1832, p. 165, for what is now known as *Triarthrus Beckii* Green.

The author also describes *Encrinurus tuberculosis* nov. sp.

Crosfield and **Skeat**. On the Geology of the neighborhood of Carmathen.

Quart. Jour. Geol. Soc. London, vol. 52, 1896, p. 523.

Peltura punctata nov. sp. *Parabolinella* sp. and *Ogygia marginata* nov. sp.

Crossman (M.) Revue Critique Paléontologie, 1902, sixieme Ann., p. 52.

Redlichia nov. gen.

The author uses this term to replace Haeferia, Redlich, Tril., 1899, non Bittner Moll., 1895.

Cumings (E. R.) The Stratigraphy and Palæontology of the Cincinnati series in Indiana.

32 Ann. Report Geol. and Natural Resources of Indiana, 1908, pp. 605, 1188, 55 plates. The Ostracoda and Trilobites are figured on pls. 53-55.

Ostracoda: *Bollia pumila* Ulrich. *Ceratopsis Chambersi* Miller and var. *robusta* Ulrich, *C. oculifera* Hall. *Ctenobolina ciliata* var. *Hammeli* M. & F. *Entomis Madisonensis* Ulrich, *Eurychilina striatonarginata* Miller. *Leperditia caecigena* Miller. *Primitia cincinnatiensis* Miller, *P. impressa* Ulrich. *Tetradella quadrilirata* H. & W., also var. *simplex* Ulrich. *Lepidcoleus Jamesi* H. & W.

Trilobites: *Acidaspis ceralepta* Anthony, *A. cincinnatiensis* Meek, *A. crosotus* Locke. *Calymmene calicephala* Green. *Ceraurus pleurexanthemus* Green, *C. icarus* Billings. *Dalmanites breviceps* Hall. *Isotelus maximus* Locke. *Proetus spurlocki* Meek. *Trinucleus concentricus* Eaton.

Referred to *Cryptolithus tessellatus* Foerste, Bull. Sci. Denison Univ., 1910, vol. X, p. 78.

Dahmer (G.) Ein Hautungsplatz von Homalontus gigas A. Roemer im linksrheinischen Unterdevon.

Jahrb. des nass. Vereins für Naturkunde 67, 1914, plates 2 and 3.

Homalonotus gigas.

Delgado (J. F. N.) Fauna Cambrienne du Haut Alemtejo.

Geol. du Portugal, vol. V, 1904, 6 plates.

In the description of fossils, p. 318, the author describes *Paradoxides Choffati* nov.; also P. aff. *abenacus* Matth. var., ? P. aff. *spinosus* Boeck, *P. costae nov.* and *P.* aff. *Tessini* Brong. Olenopsis sp. Hypostoma of Olenollus?

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The new genus Hicksia, founded on a group of species resembling Conocoryphe humerosa Salter.

It has the tumid cheek and galbella of Solenopleura, with the smooth test of Liostracus, but the glabella narrows in rear and the pygidium is smaller.

He includes 9 new species under the genus: *Hicksia elvensis, H. sphaerica, H. Transtanensis, H. Walcotti, H. Castroi, H. Hughesi, H. Barroisi, H. Dewalquei* and *H.* minuta.

Metadoxides Bornemanni, Olenellus ? Macphersoni nov. *Microdiscus caudatus* nov., *M. subcaudatus* nov., *M. Wenceslasi* nov., *M. Souzai* nov. and *M. Woodwardi* nov.

I would suggest the generic name of Delgadoia for these species, with eyes and three thorax segments, also with caudal spines.

Drevermann (Fritz). Die Fauna der oberdevonischen Tuffbraccie von Langenaubach bie Haiger.

Jarhrbuch d. K. preuss Geol. Landesanstalt für, 1900, pp. 99-207, 9 plates.

The author describes and illustrates:

Phacops cryptophthalmus Emm., *P. granulaus* Münster, *P. caecus* Gurich, *P. sulcatus* nov., *P. brevissimus* nov., P. cf. *mastophthalmus* Richter, *P. (Trimerocephalus) anophthalmus* Frech, *P. (T.) Lotzi* nov., *P. (Trim.) miserrimus* nov. *Proetus carintiacus* nov., *P. dillensis* nov. *Dechenella* sp. ? *Bronteus* cf. *granulatus* Goldf.

——— Ueber eine Vertrelung der Etroeungt-Stufe auf der rechten Rheinseite.

Zeitschr. d. Deutsch Geol. Ges. 54, pp. 480-524, pl. 14, 1904.

Brachymetopus sp. and Phillipsia sp.?

Diener (Carl). The Permocarboniferous Fauna of Chitichun, No. 1.

Memoirs Geol. Sur. of India, Palæontologia Indica, Ser. xv, vol. 1, pt. 3, 1897, p. 105, plate 13.

Cheiropyge nov. gen., *C. Himalayensis* nov. sp.

The genus was proposed for certain Trilobites from the Carboniferous or Permian rocks in which the 6 pleural ridges and 15 axial rings of the pygidium extended beyond the border, such as *Philippsia lodiensis* Meek and *Dalmanites Cuyahogae* Claypole.

A similar fossil to Cheiropyge was made into a new genus by Girty under the term of Anitopyge.

This author does not compare *Phaethonides spinosus* Herrick, Bull. Denison Univ., vol. 4, pl. 1, fig. 4, with 14 axial lobes and 9 pleurae.

The author also describes *Phillipsia Middlemissi* nov. sp., which the author compares with certain British Trilobites such as *P. Cliffordi*, etc.

Diener (Carl). Anthracolithic Fossils of Kashmir and Spiti.

Memoirs Geol. Sur. India, Palæontologia Indica, Ser. xv, vol. 1, pt. 2, 1899.

Phillipsia sp. ind. aff. *seminifera* Phillips.

This species which was figured by Lydekker, Mem. Geol. Sur. of India, vol. 22, pl. 2, figs. 5, 5a, may be congeneric with the European species, but the state of preservation of the latter is too indifferent to warrant an exact determination. An Australian species, *Griffithides dubius* Etheridge, is closely allied to the present one.

Dowling (D. B.) Report on a Survey of the Ekwan River and of the Route through Sutton Mill Lake Northward.

Geol. Sur. Canada, Ann. Report, n. ser., vol. 14, 1901, F.

Crustacea, p. 57 F: *Calymene Niagarensis* Hall, Illaenus sp. *Bronteus Ekwanensis* nov. sp., *B. aquilonaris* nov. sp., *B. Niagarensis* Hall. *Ceraurus Tarquinis* Billings.

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The [illegible] to this paper was edited by J. F. Whiteaves, pp. 38-60, therefore [illegible] new species of B[illegible] described from the pygidia should be credited to White-[illegible]

Dufet [illegible] Notes sur les déformation des fossiles contenus dans [illegible] schisteuses et sur la détermenative de quelque especes du [illegible] Ogygia.

Ann. de L'école Normale supérieure, 1875, pp. 183-190, 2 figures.

Ogygia Edwardsi Rouault, *O. Brongniarti* Rouault, *O. Guetardi* Rouault, *O. Delesii* nov. sp. figures the pygidium.

The new species has 5 axial rings, 8 side ribs and a pointed tail.

Eastman (Charles R.) Text book of Palæontology, adopted from the German of Karl A. von Zittel.

Second edition, vol. 1, 1913, 839 pp., 1594 figures.

Edgell-Wyatt (H. A.) On a new Lichas and other new forms from the Llandelio Flags.

Geol. Mag., Decade 1, vol. 3, 1866, pp. 160-163.

Lichas partriarchus nov. sp.

Most of the Swedish Lichadæ are distinguished from it by the incompleteness of the first pair of glabella furrows.

Ellis (G. L.) and **Salter** (I. I.) The highest Silurian rocks of the Ludlow Dist.

Quart. Jour. Geol. Soc. London, vol. 62, 1906, pp. 195-227, Geol. Map.

List of Ludlow fossils.

Etheridge (Robert, Jr.) The largest Australian Trilobite discovered.

Proc. Roy. Soc. Victoria, vol. 6, 1894, new ser., pp. 187-194, plate.

Bronteus enornis nov. sp.

——— Evidence of the existence of the Cambrian fauna in Victoria.

Roy. Soc. Victoria, 1895, pp. 52-64, plate.

Dinesus Ida n. gen. et sp.

The glabella has pyriform basal lobes; the bifurcating grooves near the anterior portion outline triangular lobes, on each side of the glabella. Pygidium ending in 5 or 6 short spines.

——— Official Contributions to the Palæontology of South Australia, No. 9.

On the occurrence of Olenellus in the Northern Territory.

South Austr. Parl. Papers, 1897, No. 1353, pp. 13-16, plate 1, fig. 1.

The author describes *Olenellus Brownii* n. sp., which agrees with the Swedish *O. Kjerulfi* Linnrs. He doubts the presence of facial sutures in the genus.

Peach lays great stress on the non-detection of the facial suture in Olenellus as proving that the Olenelli had no free cheek, and should therefore be separated from the Trilobita.

Quart. Jour. Geol. Soc., vol. 48, 1892, p. 242.

——— Additions to the Cambrian fauna of South Australia.

Trans. Roy. Soc. S. Australia, vol. 29, pp. 246-251, 1905.

Olenellus sp.

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ETHERIDGE (Robert, Jr.)—Continued

——— A further Cambrian Trilobite from York Peninsula.

Trans. Roy. Soc. S. Australia, vol. 22, 1898, pt. 3, plate IV.

Ptychoparia Howchini n. sp.

Woodward in 1884 described two Cambrian Trilobites from the Yorke Peninsula as *Dolichometopus Tatei* and *Conocephalites australis*. Tate has also described from the same District *Olenellus Prichardi* and *Microdiscus subsagittatus*, in Trans. R. Soc. S. Austr., 1892, XV, pl. 2, p. 187.

——— Additional Notes on the Palæontology of Queensland. Part 1, Palæozoic.

Proc. Linn. Soc. New South Wales, vol. 9, 1894, p. 528, pl. 39, fig. 3.

Griffithides Sweeti Eth. fil. MS.

This is an abnormal form departing both from Phillipsia and Griffithides in possessing 10 instead of 9 thoracic segments, and in the presence of the supplementary basal lobes on the glabella. The supplementary lobe to the glabella is present in some Proeti, such as *Proetus bohemicus* Corda. Burmeister has classed such species under Æonia, but McCoy's Forbesia had anticipated him by a few months.

——— The Trilobite Illaenus in the Silurian rocks of New South Wales.

Records Geol. Sur. N. S. Wales, vol. 8, p. 319, figs. 1-2.

Illaenus Johnstoni Eth. fil.

The original description. Tasmania Report Sec. for Mines for 1895-96, pl. fig. 3, page XLIII.

Two species of Illaenus have been recorded from the Silurian rocks of Australia. DeKoninck refers one to *Illaenus Wahlenbergianus* Barr., and the other from Tasmania was referred to this new species.

——— Trilobite remains collected on the Florentine Valley, West Tasmania, by Mr. T. Stephens.

Records of the Austr. Mus., vol. 5, part 2, 1904.

The author describes and figures the pygidium of Niobe sp. ind.; also that of *Dicelocephalus Florentinensis* Eth. fil., plate 10, figs. Walcott refers this to the genus Dikelokephalina Brögger.

——— Additions to the Cambrian fauna of South Australia.

Trans. and Proc. Roy. Soc. of South Australia, vol. 29, 1905, pp. 246-251.

The Olenellus described, p. 247, pl. 25, fig. 1, is referred by Walcott Cambrian fauna of China to the genus Redlichia.

——— The existence of a Cambrian fauna in Victoria.

Proc. Roy. Soc. of Victoria, for 1895, new ser., vol. 8, 1896, pp. 52-64.

——— and Mitchell (John). The Silurian Trilobites of New South Wales, with reference to those of other parts of Australia, Part 4.

The Odontopleuridae.

The authors use the term Odontopleuridae in preference to Acidaspidae, because they believe it to have precedence. Burmeister used the term in 1843 (Organization of Trilobites) for eight-jointed Trilobites with a short articulated caudal axis, incapable of enrollment. Division B, Subdivision A.

Proc. Linnean Soc. New South Wales, vol. 21, 1897, pp. 694-721, 6 plates.

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ETHERIDGE (Robert, Jr.) and MITCHELL (John)—Continued

The authors describe:

Odontopleura Bowningensis n. sp., *O. Rattei* n. sp., *O. parvissina* n. sp., *O. Jenkinsi* n. sp., (The *Acidaspis Brightii* Jenkins mon. Murchison). *Ceratocephala Vogdesi* n. sp. (*Acidaspis Verneuili* Ratte non. Barrande), *C. Jackii* n. sp., *C. impedita* n. sp., *C. longispina* Mitchell.

——— The Silurian Trilobites of New South Wales with references to those of other parts of Australia.

Proceedings Linn. Soc. N. S. Wales, 1915, vol. 40, part 4, 1916.

Part V, The Encrinuridae, plates 54-57, pp. 646-680.

The authors describe and illustrate the following species:

Encrinurus Mitchelli Foerste, referring *Cromus Murchisoni* DeKoninck, pl. 1, fig. 9 (exclude figs. 9a and 9b) to the species.

Encrinurus Bowningensis Foerste.

The following are described as new species:

Encrinurus silverdalensis, a robust species, about 2 inches long; the head approaches *E. variolarlis*, but its enormous tail separates it from the European species.

Encrinurus Etheridgei, the largest Australian form known, has a length of 2½ inches, of which the tail occupies one inch.

Encrinurus Rothwellae.

The subrectangular and steep-sided thorax, very prominent thorax and pygidial axis, a circular end of the tail—axis, 11 pleural segments in the pygidium, widely expanded and tumid glabella, anteriorly forward eye-lobes, and strong drooping of the pygidium posteriorly, separate this species from *E. Mitchelli.*

Encrinurus ? duntroonensis.

The authors illustrate only the head, which differs from all other species referred to Encrinurus.

1. In the transversely elongated elliptical form of the cephalon, with its nearly straight anterior border.
2. The closeness of the anterior branches of the facial sutures and the perpendicularity of the posterior branches of these, with the axial furrows, or central axial line.
3. The long, narrow and straight-sided glabella.
4. The anteriorly situated free cheek.
5. The sparse tuberlation.
6. The backward and inward situation of the eyes.
7. The manner in which the axial furrows bifurcate outward and inward on reaching the frontal borders of the free cheeks.

The authors suggest a new genus without naming it. Why not that of *Mitchellia* after this well-known author on the fossil Crustacea.

Fearnsides (W. G.), **Elles** (G. L.) and **Smith** (Bernard). The Lower Palæozoic Rocks of Pomeroy.

Proc. Royal Irish Acad., vol. 26, sec. B, No. 9, 1907, pp. 97-128, map and plate.

Trilobites: *Trinucleus concentricus* Eaton; also var. *Portlockii* Salter and var. *elongatus Portl.* and var. *arcuatus.*

Trinucleus seticornis His. *Dionide* cfr. *euglyptus* Ang. *Æglina rediviva* Barr. *Phacops mucronatus* Brong.

The other Trilobites collected from Pomeroy have been described by Portlock in his Londonderry report.

Field (R. M.) Use of the Roentgen Ray in Palæontology Skiagraphy of Fossils.

Am. Jour. Sci., vol. 39, 1915, p. 543.

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The author illustrates *Triarthrus Becki* in text and plate 8, fig. 9. The figure brings out the outline of the trilobite and several appendages which are buried in the matrix.

Finch (Grant E.) Notes on the position of the individuals in a group of *Nileus vigilans* found at Elgin, Iowa.

Iowa Acad. Sci. Proc., vol. 11, pp. 179-181, plate, 1904.

Foerste (A. F.) Notes on Clinton Group Fossils, with special reference to collection from Indiana, Tennessee and Georgia.

Proc. Boston Soc. Nat. Hist., vol. 24, 1889, p. 261.

The author notes *Calymmene Blumenbachii* var. *Vogdesi* n. var., *C. rostrata* Vogdes.

Dr. Ulrich describes from the Niagara formation at Osgood, Ind., under the name of *Calymmene nasuta* n. sp., a snouted trilobite of a very large size, which resembles *Calymmene Niagarensis* Hall. This specimen was published in the Jour. Cincinnati Soc. Nat. Hist., vol. 2, No. 3, October, 1879, p. 131, figs. 1, 2 and 3. The Harvard Library did not receive this number until Feb. 19th, 1880, or about the time of its probable publication. About this time, in the Amer. Jour. Sci. for December, 1879, a species was described by Vogdes as *Calymmene rostrata* from the Clinton Group of Georgia Catoosa Station. These forms are very closely related to New York specimens, which are not quite so large, and the end of the snout is not so pointed as the published figures would indicate.

Dr. Berjoron, Bull. Soc. Geol. de France, 3d ser., vol. xviii, 1890, p. 365, pl. v, places similar species under a new genus. Describing under it *Calymmenella Boisseli* n. sp. and n. genus. The glabella is short and rounded in front, having three furrows, of which the last two are well marked. The specimen is somewhat like *Calymmene mammillata* Hall, from the Niagara group in Wisconsin.

The author also notes *Illaenus ambiguus* Foerste, *I. ioxus* Hall. *Phacops pulchellus* Foerste. *Encrinurus punctatus* Wahl. *Lichas Boltoni* var. *occidentalis* ? Hall and *Cyphaspis clintoni* n. sp.

The author, on p. 272, places *Encrinurus ornatus* Hall with *E. Theschi* Foerste. He was in doubt regarding the Ohio specimen referred by Hall and Whitfield to *E. ornatus*, on account of its larger size and its higher geological position.

——— A description of the Trilobites, Mollusks and Brachiopods of the Clinton Group of Ohio and Indiana.

Geology of Ohio, vol. vii, 1893, pp. 522-601, plates 25-37a.

The author notes *Acidaspis Ortoni* Foerste, *A. brevispinosa* n. sp. *Proetus determinatus* Foerste. *Cyphaspis clintonensis* Foerste. *Illaenus daytonensis* H. and W., *I. ambiguus* Foerste, *I. insignis* Hall, *I. madisonensis* Whitf. *Calymmene Vogdesi* Foerste. *Ceraurus (Pseudosphaerxochus) clintoni* n. sp. *Sphaerexochus pisum* n. sp. *Lichas breviceps* Hall. *Phacops trisulcatus* Hall. *Dalmanites Wertheri*. *Encrinurus punctatus* Wald. *Elpe Ulrichi* n. sp.

——— Characteristic Silurian Fossils from East Central Kentucky.

Geol. Sur. Kentucky Bulletin, No. 7, 1906, Part 3.

The author describes *Isochilina panolensis, Beyrichia lata-triplicata*. He also remarks that Prof. Hall, in Palæontology of New York, vol. 2, p. 301, published descriptions of a species of Bollia and of a species of Beyrichia under the same name *Beyrichia lata*, erroneously regarding these distinct species as opposite valves of the same species. Beyrichia is described first, but on Plate A 66 the Bollia is figured first.

The author refers to *Bollia lata* Hall's fig. 10b, and to *Beyrichia lata* Hall's figs. 10, c, d, e, pl. A 66.

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FOERSTE (A. F.)—Continued

——— Silurian Fossils from the Kokomo West Union and Alger horizons of Indiana, Ohio and Kentucky.

Jour. Cincinnati Soc., vol. xxi, No. 1, 1909.

The author describes and illustrates *Isochilina panolensis* Foerste, *I. musculosa* n. sp. *Beyrichia lata—triplicata* Foerste. *Kloedenia kokomoensis* n. sp. *Illaenus depressus* Foerste. *Calymmene Clintoni* Vanuxem, *C. niagarensis* Hall. *Homolanotus delpinocephalus* Green. *Dalmanites timulurus brevicaudus* var. nov.

——— Preliminary note on Cincinnatian Fossils.

Bull. Denison Univ., June, 1909, vol. 14.

The author describes *Ceraurus miseneri* nov. sp. from Richmond, Ind.

——— Preliminary note on Cincinnatian and Lexington Fossils of Ohio, Indiana, Kentucky and Tennessee.

Bull. Denison University, June, 1910.

The author favors the use of Cryptolithus Green, for the genus Trinucleus, a generic term used by Bronn, Goldfuss, Emmrich, Angelin and Vogdes; although the generic name of Nuttainia was used by Eaton in 1832, in his Geological Text Book, 1832, p. 33, for a similar species to *Trinucleus tessellatus* Green.

The original description of this genus by Green, The Monthly American Journal of Geology, June, 1832, p. 560, pl. fig. 4, is as follows:

Genus Cryptolithus, *C. Tessellatus Green*, fig. 4.

"Clypeo rotundato, fronte valde convexo, capite antice semicirculari, margine tessellato, ornato."

Green Mon. Trilobites, p. 88, remarks Cryptolithus was proposed before the publication of Nuttainia Eaton.

Rafinesque in his paper dated Philadelphia, May, 1832, Atlantic Journal and Friend to Knowledge, vol. 1, No. 2, 1832, article on "The Genera of fossil Trilobites or Glomerites of N. America," mentioned Cryptolithes Green, on p. 72, and remarks that Dr. Green issued in April a first series of eight cast and species, accompanied with a synoptical table, among which a new genus Dipleura, and four new species of Asaphus and Calymmene.

Vogdes, in Bib. Palæozoic Crustacea, 1893, p. 359, remarks that Trinucleus Lhwyd, 1698, Lithophyacii Brittannici Ichnographia, Epistola 1, also Murchison Silurian System, 1839, p. 659, was a revived old name. Dr. Lhwyd's description meant no more than the general name of Trilobite of the more modern writers and could not, except by courtesy, set aside Dr. Jacob Green's gen. *Cryptolithus*. This generic name has been advocated by Foerste, also by Raymond, in a later publication.

The author also describes *Calymmene platycephala* sp. nov., *C. senaria* Conrad, *C. abbreviata* sp. nov., *C. callicephala* Green, *C. Meeki* sp. nov., *C. Meeki—retrorsa* and *Dalmanites Carleyi—rogersensis*.

Calymmene Meeki Foerste, Bull. Denison Univ., vol. 16, 1910, p. 84, pl. 3, fig. 18. This is the Calymmene senaria described by Meek from the Cincinnati Rocks. As types the larger specimens from Fairmont bed are selected. They have a rather extended posterior outline of the cephalon, resulting in acute genal angles.

Frech (Fritz). Die Karnischen Alpen, 1894.

The author refers *Phacops (Trimerocephalus) cryptophthalmus* (Emm.) Trestze to the new species of *anophthalmus*.

——— Palæozoica, 1897, Bd. 2, Theil 1.

The author describes as new *Phacops (Trimerocephalus) anophthalmus*, p. 278, plate 35, fig. 18.

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——— Lethæa geognostica, part 1, Lethæa palæozoica, Bd. 2, p. 66, 1902.

The author proposes the genus Proampyx for *Anomocare acuminatum* Angelin. This species, with its pointed glabella, seems to be the forerunner of Ampyx, and differs from the typical Anomocare with rounded, cephalic shield, very greatly.

Fritsch (Dr. Ant.) Preliminary notes on *Prolimulus Woodwardi* from the Permian Gaskohle als Nyran Bohemia.

Geol. Mag. London, Decade iv, vol. 6, 1899, pp. 57-59.

The author gives a figure of *Prolimulus Woodwardi* on p. 58, and remarks that Prolimulus very closely resembles one of the embryonic stages of the living North American *Limulus polyphaemus*. The earliest known Limuloid Crustacean named *Neolimulus falcatus*, Woodward Geol. Mag., vol. 5, p. 1, pl. 1, figs. 1, 1a, 1868, was from the Silurian of Lesmahagow, Scotland. Bailey described *Bellinurus Kiltorkensis* from the Upper Old Red Sandstone Kiltorcan, Ireland, in 1869.

The genus Bellinurus was established by Konig in 1825, for certain small king crabs, under the specific name of *B. bellulus*, without a description of the genus or species. It is now known as *Bellinurus lumatus* Martin Petrefacata Derbiensia, pl. 45, fig. 4.

Bailey in 1863 described *B. arcuatus* and *B. reginae*, from the Coal Measures of Queens County, Ireland. In 1872 Woodward described *B. Koenigianus* Coal Measures, Dudley.

Meek and Worthen from the Coal Measures of Illinois, describes *Prestwichia (Limulus) anthrax* Prest. and *P. rotundata* Prest.

In 1872 Woodward described *P. Birtwelli* from Coal Measures, Padiham, Lancashire.

These Crustaceans have been described from the Muschelkalk, Jurassic, Cretaceous and Tertiaries, and are now living in the seas of Eastern North America and of Japan. A remarkable persistent type of the Xiphosura from the Silurian to the present time.

Frood (A. H.) Description of fossils from Kimberley District, Western Australia.

Geol. Mag. London, Decade 3, 1890, vol. 7, p. 98.

Olenellus ? Forresti n. sp., pl. 4, figs. 2 a-b.

Walcott, 1913, p. 104, refers this to the genus Redlichia.

Gaudry (A.) Les enchainements du monde animal dans les temps Géologiques Fossils Primaires, Chapter X, 1877.

The author illustrates many species of Palæozoic Crustacea with figures of *Asaphus platycephalus* and *Calymmene senaria* exhibiting the ventral side and structure of the feet and antennae.

Geinitz (H. B.) Die Versteinerungen der Steinkohlen formation in Sachsen, Leipzig, 1855.

The author describes as *Halonia irregularis* several fragments of Arthropleura, p. 38, pl. 4, fig. 5.

Gemmellaro (G. G.) Crostacei dei calcari con fusulina della Valle del fiume sosio nella Prov. di Palermo in Sicilia.

Mem. Soc. Ital. Sci., vol. 8, 1890, 3d ser., 40 pp., with 5 plates.

Trilobiti—*Proetus postcarbonarius*, n. sp., *P. ? Salomonensis* n. sp. *Phillipsia sicula* n. sp., *P. Oehlerti* n. sp., *P. Sosiensis* n. sp., *P. pulchella* n. sp. *Griffithides verrucosus* n. sp. *Pseudophillipsia elegans* n. gen. et sp.

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The type of the new genus is *Pseudophillipsia Sumatrensis* Roemer.

Macruros Crustaceans—*Palaeopemphix* n. gen., *P. Sosiensis* n. sp., *P. affinis* n. sp., *P. Meyeri* n. sp.

Brachyurous Crustaceans—*Paraprosopon* n. gen., *P. Reussi* n. sp. *Oonocarcinus* n. gen., *O. insignis* n. sp., *O. anceps* n. sp., *O. Geintzi.*

Ostracoda—*Cypridinella rostrata* n. sp., *C. inflata* n. sp., *C. cypridellopsis* n. sp., *Cypridella Jonesi* n. sp., *C. granulifora* n. sp. *Cypridina Adrianensis* n. sp., *C. elliptica* n. sp., *C. marginata* n. sp., C. aff., *C. primaevae* McCoy. *Philomedes acânthoides* n. sp. *Entomoconchus elongatus* n. sp. *Entomis polita* n. sp., *E. aequilobatus* n. sp. *Beyrichia* sp.?

Girty (George H.) Devonian and Carboniferous Fossils.

U. S. Geol. Survey, Monograph No. 32, 1899; part 2, pp. 476-581.

Proetus peroccidens H. and W., *P. Loganensis* H. and W.

The author is inclined to include both of these species under one, but leaves it an open question.

——— Notes on the Carboniferous Fossils, Geology and ore deposits Bisbee Quadrangle, Arizona.

U. S. Geol. Survey, Professional Papers No. 21, 1904, pp. 46-53, 2 plates.

Phillipsia peroccidens H. and W. figured the pygidium, pl. X, fig. 22. The species is rather characteristic of the Escabrosa Limestone.

——— The Guadalupian fauna.

Professional Paper U. S. Geol. Sur., No. 58, Washington, 1908.

The author uses *Anitopyge* new genus for *Phillipsia peranulata* Shumard.

The genus Phillipsia has 9 thoracic segments, and the new genus, as far as known, has but 7. In the pygidium the axis contains about 30 joints.

Anitopyge is similar to *Cheiropyge* (a new genus described by Diener of Himalayan fossils) in the unequal segmentation of the axial and lateral portions of the pygidium—in Anisopyge the pygidium is surrounded by a broad, smooth band, while in Cheiropyge the lobes are extended so as to give this member a denticulate outline.

The author describes *Anisopyge antiqua* n. sp. *Cythere* ? sp. *Bairdia* aff., *B. plebeia* Ruess, *Argilloecia* sp.

——— The fauna of the phosphate beds of the Park City formation in Idaho, Wyoming and Utah.

Bull. U. S. Geol. Sur., No. 436, Washington, 1910.

The author describes and figures *Hollina emaciata* var. *occidentalis* n. var. *Jonesiana carbonifera* n. sp., which closely resembles the English species *J. arcuta,* but differs in a more equilateral form with a much narrower sulcus.

. *Cytherella benniei* J. and B.

——— The fauna of the Moorefield shale of Arkansas.

Bull. U. S. Geol. Sur. No. 439, 1911.

The author records an undetermined Griffithides and three Ostracoda. *Paraparchites nicklesi* Ulrich, *Primitia moorefieldana* n. sp. and *Bairdia attenuata* Girty.

——— On some new genera and species of Pennsylvania fossils, from the Wewoka formation of Oklahoma.

Ann. N. Y. Acad. Sci., vol. 21, pp. 119-156, 1911.

Describes *Griffithides parvulus* n. sp. Differs from *G. ornatus* in the configuration of the basal portion of the glabella.

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GIRTY (George H.)—Continued

——— A report on the upper Palæozoic fossils collected in China in 1903-04.

Carnegie Inst. Washington, Research in China, vol. 3, 1913, pp. 297-328, pls. 27-29.

The author illustrates an imperfect pygidium of Phillipsia, somewhat like *P. scitula* of the American Coal Measures.

——— New genera and species of Carboniferous fossils from the Fayetteville shales of Arkansas.

Annals New York Acad. Sci., vol. 21, 1910, pp. 189-238.

Griffithides parvulus nov., *G. mucronatus* nov.

——— Fauna of the Wewoka formation of Oklahoma.

Bull. U. S. Geol. Sur., No. 544, 1915.

The author refers *Phillipsia (Griffithides ?) Sangamonensis* M. and W. to the genus Phillipsia. *Griffithides parvulus* Girty. The surface is marked by granules of small nodes.

The author compares it with *G. ornatus,* but is much smaller and differs in the configuration of the basal portions of the glabella.

——— Fauna of the Batesville sandstone of Northern Arkansas.

Bull. No. 593, U. S. Geol. Sur., 1915.

The author describes *Griffithides mucronatus* nov. The same name was used by Traquair in 1862, for an Irish species of the genus, which Woodward, 1883, referred to *Phillipsia Eichwaldi* var. *mucronatus.*

Goldenberg (Fr.) Fauna Sarepontana Fossilis Die fossilen Thiere aus Steinkohlenformation von Saarbücken Hefts 1 and 2, 1875 and 1877.

Arthropleura affinis sp. nov., pl. 1, figs. 11-12.

Gorham (Frederic P.) The Cambrian deposits of North Attleboro.

Bull. No. 9, Roger Williams Park Mus., Providence, R. I., 1905.

The author illustrates from Shaler and Foerste's Bull. Mus. Comp. Zool. of Harvard Univ., 1888.

Olenellus Walcotti Shaler and Foerste may be identical with *Elliptocephala asaphoides* Emmons. *Microdiscus lobatus* Hall. *Ptychoparia attleborensis* S. and F. Aristozoe *Microdiscus belli-marginatus* S. and F. *Ptychoparia mucronata* S. and F. This may be *Atops trilineatus* Emmons. *Microdiscus speciosus.*

Grabau (A. W.) Guide to the Geology and Palæontology of the Niagara Falls and vicinity.

Bull. N. Y. State Mus., No. 45, vol. 9, 1891.

The author illustrates the Palæozoic crustacea of the New York Niagara Group with original figure of *Eurypterus remipes.*

——— Palæontology of the Cambrian Terraines of the Boston Basin.

Occasional Papers Boston Soc. Nat. Hist., vol. 4, part 3, 1901, pp. 601-694, plates 31-39.

Trilobita: *Olenellus (Holmia) Bröggeri* Walc. O. sp., *O. (Mesonacis) asaphoides* (Emm.), *O. Walcotti* S. and F. *Metadoxides magnificus* Matth. *Microdiscus belli-marginatus* S. & F., *M. lobatus* Hall, *M.* sp. *Strenuella strenura* (Bill.). *Argulos quadrangularis* Whitf.

The author represents a restored figure on p. 676, with 16 ? thorax segments, with measurements of the head, which varies in length, exclusive of the occipital ring, from

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GRABAU (A. W.)—Continued

7 to 20 mm. *Ptychoparia Rogersi* Walc., *P.? attleborensis* S. and F. *Paradoxides Harlani* Green.

The author remarks that among the American relative of *Paradoxides Harlani* the most nearly related to the broad form is *P. regini* Matthew, from St. John Group; also *P. Bennetti* Salt.

The nearest relative of the narrow form is the *Paradoxides spinosus* the Bohemian species. Many years ago Linne Mus. Tessiniaum, 1753, p. 98, pl. 3, described under the name of *Entomolithus paradoxus* a trilobite of a wide form, about 6¾ inches long. Brongniart describes it as *Paradoxides Tessini,* using the narrow form of Wahlenberg's pl. 1, fig. 1, which he has copied.

The original, quoted from Dimbo, Sweden, by Linné, has never been again found in Sweden, the specimen may be one from Boston, Mass., obtained from the Boston Wharves by some Swedish naturalist in early days, the stones from the Braintree quarries were used in the Boston Harbor.

——— Guide to the Geology and Palæontology of the Niagara Falls and vicinity.

Bull. No. 45, vol. 9, 1901, New York State Museum.

The following Foss crustacea are described and illustrated:

Iscochilina cylindrica (Hall). *Leperditia scalaris* Jones, fig. 150. *Bollia symmetrica* (Hall), fig. 151. *Æhmina spinosa* (Hall), fig. 152.

Trilobita—*Homalonotus delphinocephalus* (Green), fig. 153. *Illaenus ioxus* Hall, fig. 154. *Dalmanites linulurus,* fig. 155. *Calymmene Blumenbachi Niagarensis* Hall, fig. 156. *Lichas Boltoni,* plate 17. *Encrinurus ormata* H. and W., fig. 157. *Bronteus Niagarensis* Hall, fig. 158. *Ceratiocaris acuminata* Hall, fig., *C. Physganocaris? Deweyi* Hall, fig. 160. *Eurypterus lacustris* Harland, *E. remipes* DeKay, fig., pl. 18, *E. pustulosus* Hall, *E. robustus* Hall, *E. pachychirus* Hall, *E. Dekayi* Hall. *Dolichopterus macrochirus* Hall. *Eusarcus grandis* G. and P. *Pterygotus macrophthalmus* Hall, *P. Cobbi* Hall, *P. globicaudatus* Pohl.

——— The Palæontology of Eighteen Mile Creek and Lake Shore sections of Erie County, New York.

Bull. Buffalo Soc. Nat. Sci., vol. 6, 1901, in four parts.

Ceratocaris Deweyi Hall, *C. acuminata* Hall.

——— Guide to the Geology and Palæontology of the Niagara Falls and vicinity.

Bull. Buffalo Soc. Nat. Sci., vol. 9, 1902.

——— and **Sherzer** (W. H.) The Monroe formation of southern Michigan and adjoining regions.

Michigan Geol. and Biological Sur. Geol., ser. 1, 1910.

Ostracoda—*Leperditia scalaris* Jones, *L. angulifer* Whitf., *L. attoides* nov., *L. alta Con. Kloedenia Monroensis* nov.

Trilobitae—*Proetus crassimarginatus* Hall.

Merostomata—*Eurypterus Eriensis* Whitf.

——— North American index Fossil Invertebrates.

Two volumes, New York, 1910, 909 pp., 726 figures.

Gives brief descriptions of genera and species. Appendices give tables of geological formation and a faunal summary showing distribution, also a classified bibliography.

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Gronwall (Karl A.) Bornholm Paradoxideslag og deres Fauna Darnarks.

Geol. Under. II Rackke, No. 13, Kjobenhavavn, 1892.

Thirty-five species or varieties of the genus Agnostus are figured and described:

Agnostus aculeatus Ang., *A. altus* n. sp., *A. atavus* Tbg., *A. bibullatus* Barr., *A. bidens* Meek, *A. bituberculatus* Ang., *A. brevifrons* Ang., *A. cambrensis* Hicks, *A. cicer* Tbg. and var. *forfex* n. var., *A. elegans* Tbg., *A. Eskriggei* Hicks, *A. exaratus* n. sp., *A. exsculptus* Ang. ex parte cf. *integra* Walc. and cf. *sulcifera* Walc. *Agnostus fallax* Lnrs. cf. *ferox* Tbg. and var. *insignis* Walc., *A. fissus* Lng. MS. and var. *perrugatan* var. and var. *trifissa* Matth. *Agnostus gibbus* Lnrs. and var. *hydrida* Br. *Agnostus gladiformis* Ang. and var. *resecta* n. var. *Agnostus incertus* Barr., *A. insularis* n. sp., *A. integer* Barr. and var. *spinosa* Pomp., *A. intermedius* Tbg., *A. Kjerulfi* Br., *A. laevigatus* Dalm., also var. *ciceroides* Matth., var. *forfex* Br., var. *mammilla* Matth., var. *similis Br.* and var. *terranovica* Matth. *Agnostus lens* n. sp. and var. *frontosa* n. var., *A. lingula* n. sp., *A. Lundgreni* Tbg. and var. *nana* n. var., *A. Nathorsti* Br. and var. conflens Matth. *Agnostus nudus* Beyr., also var. *marginata* Br. and *scanica* Tbg. *Agnostus parvifrons* Linrs., also var. *mammillata* Br. and *nepos* Br. *Agnostus planicauda* Ang. and var. *vestgothica* Wall., *A. punctuosus* Ang., also var. *affinis* Br. and *bipunctata* Br. *Agnostus pusillus* Tbg., *A. quadratus* Tbg., *A. rex* Barr., *A. rotundus* n. sp., *A. stenorrhachis* n. sp., *A. tessela* Matth., *A. truncatus* Br. and *A. umbo* Matth. *Agralos ceticephalus* Barr., *A. depressa* n. sp., *A. difformis Ang., also var. aculeate* (Ang.) Br. and *acuminata* (Ang.) Br., *A. longicephalus* Hicks. *Anomocare Angelini* n. sp., *A. angustifrons* Tbg., MS., *A. excavatum* Ang., *A. laeve* Ang., *A. latelimbatum* Dames, *A. limbatum* Ang. *Anopolenus* Salter. *Apatocephalus* Br. *Arionellus* Ang. *Atops* Emmons. *Beyrichia Angelini* Barr. and var. *armata* n. var.

Cainatops Matth. *Carausia Meneviensis* Hicks. *Centropleura Henrici* Salt., *C. impar* Hicks, *C. Loveni* Ang., *C. Salteri* Hicks, *C. Steenstrupi* Ang., *C. venusta* Bill. *Conocephalina ornata* Br. The author uses Brögger's generic name, but does not define the genus. *Conocoryphe aequalis* Linrs., *C. Baileyi* Matth., *C. bufo* Hicks, *C. Dalmanni* Ang., *C. elegans* Walc., *C. emarginata* Lnrs., *C. glabrata* Ang., *C. Heberti* Berg., *C. Levyi* Berg., *C. pustulosa* Matt., *C. reticulata* Walc., *C. Sulzeri* v. Schloth., *C. tenuicincta* Lnrs., *C. trilineata* Emm., *C. (Erinnys) breviceps* Ang., *C. (Erinnys) venulosa* Salt., *C. (Ctenocephalus) coronata* Barr., *C. (Ctenocephalus) exsulans* Lnrs., *C. (Ctenocephalus) laticeps, C. (Ctenocephalus) Matthewi* Hartt, *C. (Ctenocephalus) Solvensis* Hicks, *C. (Ctenocephalus) tumida* n. sp., *C. (Liocephalus) impressa* Lnrs., *C. (Liocephalus) Linnarssoni* n. sp., *C. (Liocephalus) Lyelli* Hicks, *C. (Liocephalus) teres* n. sp. *Corynexochus bornholmiensis* n. sp., *C. Romingeri* Matt., *C. spinulosus* Ang., *C. umbonatus* Ang. *Dorypyge Curticei* Walc., *D. danica* n. sp., *D. desiderata* Walc., *D. Ellsi* Walc., *D. gothica* H. and W., also var. *acadica* Matth., *D. horrida* Matth., *D. oriens* n. sp., *D. quadriceps* H. and W., also var. *valida* Matth., *D. Richthofeni* Dames, *D. Slatkowskii* Fr. Schm. *Holocephalina inflata* Hicks, *H. primordialis* Salt. *Leperditia primordialis* Lnrs. *Liocephalus* n. subgen.

The new subgenus Liocephalus has as type species *C. impressa* Lnrs. and *C. Lyelli* Salt., and it is also probable that Salter's genus Holocephalina is to be referred hither.

Liostracus globiceps n. sp., *L. Linnarssoni* Br., *L. Maydelli* Fr. Schm., *L. microphthalmus* Ang., *L. platyrrhinus* n. sp. *Microdiscus pulchellus* Hartt, *M. punctatus* Salt., *M. scanicus* Lnrs., also cf. *cucentra* Lnrs. *Neolenus granulatus* Matth., *N. serratus* Rom. *Olenoides Fordi* Walc., *O. Marcoui* Whitf., *O. nevadensis* Meek.

Paradoxides Abenacus Hartt, *P. bohemicus* Boeck, *P. brachyrrhachis* Lnrs., *P. Davidis*

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GRONWALL (Karl A.)—Continued

Salt., *P. eteminicus* Matth., *P. Forchhammeri* Ang., *P. Harknessi* Hicks, *P. Hicksii* Salt., also var. *palpebrosa* Lnrs., *P. lamellatus* Hartt, *P. mediterraneus* Pomp., *P. Pingelii* (nov. Beck MS.).

Grönwall, p. 107, refers *Paradoxides Davidis* Salt., to *P. Pingelli* Beck MS. The author refers to an unpublished plate 43 of Angelin's fasc, on which *P. Davidis* Salt. is reproduced under the name of *P. Pingelii* Beck MS.

Paradoxides pradoanus Barr., *P. rugulosus* Corda, *P. Sjögreni* Lnrs. and var. *nepos* n. var., *P. spinosus* Boeck, *P. Tessini* Brong., *P. tumidus* Ang., *P. Ölandicus* Sjögr., *P.* sp. indet. Nos. 1-3.

Ptychoparia Johnstrupi n. sp., *P. striata* Emmr. *Solenopleura acadica* Whiteave's MS. and var. *elongata* Matth. *Solenopleura brachymetopa* Ang. and var. *alutacea* Br., also *nuntia* n. var., *S. bucculenta* n. sp., *S. canaliculata* Ang., *S. holometopa* Ang., *S. parva* Lnrs. *Zacanthoides Eatoni* Walc., *Z. flagricaudus* White, *Z. humerosus* Salt., *Z. levis* Walc., *Z. spinosus* Walc., *Z. typicalis* Walc.

Gortani (Michele). Contribuzioni allo studio del Palæozoico Carnico Le Fauna a Climenie del Monte Primosio.

Mem. R. Acad. Sci. Bologna, ser. 6, vol. 6, 1907, pp. 201-243, plates 1-2.

The author divides the genus Trimerocephalus McCoy into the subgenus *Eutrimerocephalus*. In which he places *T. laevis* Münster, *Phacops (Trim.) anophthalmus* Frech, *P.(Trim.) carithiacus* Frech, and a new species under the title of *Trimerocephalus (Eutrimerocephalus) carnicus*. This series without eyes.

2—Subg. Microphthalmus with small eyes slightly faceted. The author places under this: *Trimerocephalus (Microphthalmus) cryptophthalmus* Emm., *T. (M.) pseudogranulatus sp.* nov., *T. (M.) mastophthalmus Richter* sp., *T. (M.) Roemeri* Gortani, *T. (M.) macrocephalus Richter* sp., *T. (M.) incisus* Roemer sp., *T. (M.) acuticeps* Kayser.

Under the genus Proetus the author records one species. *Proetus* cf. *Phocion* Billings, 1874; a small tail only. Under Dechenella the author records two species. Fragments of the head so far only figured. *Dechenella Vinassasi* n. sp., Rudf. Richter refers this to *Cyrtosymbole vinassai* (Gortani), also the other species *Dechenella italica*.

Gortani (M.) and **Regny** (P. Vinassa). de Fossili neosilurici del Pizzo di Timau e dei Pal Nell'alta Carnia.

Memoria Acad. Sci. Bologna, ser. 6, 1909, p. 87-119, plate 1.

The fossil Crustacea indicated by the authors are Ostracoda Aparchites indt. compared with *A. mitis* Jones and *Lindströmi* Jones.

Trilobites: *Encrinurus Beaumonti* Barr. var. *Noväki* Frech, *Proetus* n. f. *(foveolatus* n. sp.) The authors illustrate moveable cheek of this species comparing it with *Proetus crassiimargo* Hall.

Harpes crassifrons Barr. var. *forojuliensis* n. sp. The authors illustrate a fragment of the head of this species.

Groom (T. T.) On a new Trilobite from the Dictyomena shales of Malvern Hills.

Geol. Mag. London, Dec. IV, vol. 9, 1902, pp. 70-73, 4 figures.

Acanthopleurella Grindrodi n. gen. et sp.

The conformation of the head suggest Trinucleoid affinites, but there is no marginal rim, and the rest of the body appears to show Olinid characters. Shumardia is possibly an ally, but the new genus differs in the extension of the glabella to the front margin of the head, in the absence of glabella furrows, and in the spinous prolongation of the thoracic pleurae.

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Gümbel (C. W.) Geognostische Beschreibung des Fichtegebirges, 1879.

The author refigures the original of *Trinucleus laevis* Münster with eyes, together with granulations over the surface of the head shield. He identifies *Trinucleus laevis* Münster with *phacops cryptophthalmus.*

Gortani, 1909, p. 229, refers Münster's species to *Trimerocephalus. (Eutrimerocephalus) laevis* v. Münster.

Gunther (A. F.) Ueber die Trilobiten u Rudisten.

Sitzber, d. Ges Isis, Dresden, Jhg., 1869 (1870), pp. 12-15.

Sao hirsuta Barr.

Gürich (Georg). Das Palaeozoicum des Polnischen Mittelgebirges.

Verhandl d Russ Kaiseri Mineralog Ges, vol. 32, 1896.

Arthropoda, pp. 353-373, plates 10 and 15.

The work contains descriptions and illustrations.

Agnostidae: *Agnostus fallax* Linnr. *A. gibbus* Linnr.

Olenidae: Paradoxides of Tessini Brong.

Concephalidae: *Liostracus Linnarsoni* Brögger.

Broteidae: Bronteus sp., *B. Kielcensis* n. sp.

The author refers *B. flabellifer* var. F. Roemer Z. D. Geol. Ges., 1866, p. 671, pl. 15, fig. 1a-c 6 to this new species.

Phacopidae: *Trimerocephalus typhlops* sp. nov.

Frech gives the name of *Phacops anophthalmus* for *Phacops cryptophthalmus* Emmr. (F. Roemer Z. D. Geol. Ges, 1866, pl. 13, figs. 6-7.)

Gürich refers it to his new species.

Trimerocephalus sp.

Phacops caecus n. sp. (a species without eyes), *P. Posidoniae* n. sp., *P. Schlotheimi* Bronn. and *P. latifrons* Br. *Cryphaeus lacinatus* F. Roemer.

The author refers *C. Grootei Beushausen,* 1884, to this species.

The author gives the name of *Cryphaeus Kayseri* for Kayser's Cryphaeus Lethaeae Faunades Hauptquarzites der Wiedaer Schiefer, p. 86.

Acidaspidae: Two species.

Proetidae: *Cyphaspis ceratophthalmus* Goldf., *C.* sp. *Proetus* cf., *cornutum* Goldf., *P. margaritaceus* n. sp. *Dechenella Dombrowiensis* n. sp. Richter refers this to his new subgenus Basidechenella. *Dechenella polonica* n. sp. Ritcher refers this to his new subgenus Eudechenella. *Dechenella pusilla* n. sp. Richter refers this to the new genus Cyrtosymbole.

Ostracoda: pp. 374-391.

Entomidae: *Entomis migratoria* n. sp., *E. serratostriata* Sandb., *E.* sp., *E. tenera* n. sp., *E. angulosa* n. sp., *E. vittata* n. sp., *E. scabra* n. sp., *E.* cf. *gyratan* Richter, 1869.

Entomis sp. (cf. *nitidan* F. A. Roemer, Beit, pl. 4, fig. 20).

Leperditidae: *Leperditia phaseolus* His. Silurian.

Leperditia Amphiporae n. sp. Devonian. *Bolboxoe polonica* n. sp.

New genus Antitomis, type *A. bisulcata* n. sp.

Trigonocaris dubia n. sp.

Primitia humiliformis n. sp., *P. obliqua* n. sp., *P. ornatissima* n. sp., *P. plana* n. sp., *P. lentiformis* n. sp., *P. fabaeformis* n. sp., *P. Calceolae* n. sp. *Primitia* sp., *P. entomidella* n. sp. *Primitiopsis piciformis* n. sp.

Aparchites sp.

Beyrichia Kloedeni McCoy, *B.* cf. *Buchianan* R. J., *B.* cf. *Salterianam* R. J. *Kloedenia* cf. *Wilkensianam* R. J.

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GURICH (Georg)—Continued

Bollia sp.
New genus Polyzgia, type *P. symmetrica.*
New genus Poloniella, type *P. devonica.*
Bythocypris polaris n. sp. *Bairdia devonica* n. sp.

——— Nachtrage zum Palaozoicum des Polnisschen Mittlegebirges.

Neuen Jahrb. für Mineral Geol. and Palaeont. Beilarge, Band XIII, 1900, pp. 331-388, plates 14 and 15.

The author describes several new species of Trilobites, which he illustrates as *Illaenus polonicus* nov. sp., which he compares with *I. parvulus* Holm and *Panderia minima* Volborth. *Aeglina Kontkiewiczi* nov. sp., figure of the pygidium. *Proetus margaritaceous* Gür., fig. in text, *P. pyriformis* sp. nov., fig. of glabella, *P. Michalskii* Gür. *Dechenella pusilla* Gür. *Beyrichia trigonata* Gür.

——— Jura und Devon Fossilien von White Cliff, Australien.

Neuen Jahrbuch für Min. Geol. and Palaeont. Beilage, Band xiv, pp. 484-539, plates 18-20, 1901.

The author describes a new genus of Lichas as Craspedarges including under it one species, *C. Wilcanniae* Gürich. He also gives figures of *Euarges meridionalis* Frech and *E. granulosus* F. A. Roemer. The author uses as subgenera to Lichas the following subgenera:

Ceratages for the preoccupied term Arges Goldf., with *L. armatus Goldf.* for its type.

Plusiages for Corydocephalus Corda, owing to the uncertainty attached to Corda's types, Type *L. palmatus* Barr.

Liparges substituted for Corda's Dicranoymus, type *L. simplex* Barr.

Trachylichas name proposed in place of Dicranopeltis Corda, type *Lichasscarba* Beyr.

Echinolichas Gurich type *L. eriopis* Hall.

Metopolichas used for preoccupied name Metopias Eichw., type *L. Hubneri* Eichw.

Platopolichas Gurich, type *L. avus* Barr.

Platylichas, type *Lichas margaritifera* Nieszk.

Dr. Gurich takes *Platymetopus Holmi* Schmidt as the type of this genus, but it should be abandoned for the group, as it was used by Dejean in 1829 for a genus of insects.

Pterolichas for *Arctinurus Boltoni.*

Platynotus was used by Conrad in 1838 for the same species.

Euages for preoccupied term Acanthopyge Corda, type *L. Haureri* Barr.

Leiolichas Schmidt, type *L. illaenoides* Nieszk.

Homolichas Schmidt, type *L. depressus* Ang.

Hoplolichas Dames, type *L. tricuspidata* Beyr.

Ceratolichas Hall and Clarke, type *L. gryps* Hall.

Conolichas Dames, type *L. aequiloba* Steinhardt.

Hemiarges Gurich, type *L. Wesenbergensis* Schmidt.

Platymetopus Ang., type *L. planifrons* Ang. (Amphilichas Raymond).

Oncholichas Schmidt, type *L. ornatus* Ang.

Hall (James). Relations of the genus Eurypterus.

Proc. Am. Acad. Arts and Sci., vol. 4, 1860, p. 353.

——— On the genus Eurypterus.

Trans. Albany Inst., vol. 4, 1860, p. 280.

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HALL (James)—Continued

——— Preliminary notice of the Fauna of the Potsdam sandstone, with remarks upon previously known species of fossils and descriptions of some new ones from the sandstone of the Upper Mississippi Valley.

Trans. Albany Institute, vol. 5, 1867, pp. 93-195, with six plates.

A notice of this paper was read before the Albany Institute April 29, 1862, and by an arrangement between the Publishing Committee and the Regents of the University, it was published in the 16th Report on the State Cabinet, pp. 119-226. The starred pages 135 and 136 were not issued in the Trans. Albany Inst.

On page 193 of the Trans. Albany Inst., the text contains figures of *Pemphigaspis bullata*, also figures of *Amphion ? matutina, Conocephalites (Arionellus) dorsalis* and *C. optatus*, not republished in the text of the 16th Report N. Y. State Cabinet, but included in Plate V. A. except *C. dorsalis*.

For list of fossil Crustacea, see 16th Report N. Y. State Cabinet, 1863; also Contributions to Palæontology from investigations made during the years 1861-1862.

Harbort (E.) Ueber mitteldevonische Trilobitenarten im Iberger Kalk bei Grund im Harz.

Zeitschr. Deutsch. Geol. Ges Bd., 55 Jahrg, 1903, pp. 474-485, 2 plates.

Acidaspis pigra Barr. *Cyphaspis ceratophthalma* Goldf., *C. convexa* Barr. *Bronteus granulatus* Goldf., *B. flabellifer* Goldf. *Harpes* cf. *socialis* Barr., *H. convexus* Trenkn.

Haynes (Winthrop P.) Discovery of bivalve Crustacea in the coal measures near Pawtucket, R. I.

Science N. S., vol. 37, No. 944, pp. 191-192, 1913.

The author records the discovery of the carapaces of bivalve Crustacea of the genus Leaia and Estheria from the Narragansett Basin coal measures, which the author compares with *Leaia tricarinata* Meek and Estheria not sufficiently well preserved to determine.

Henderson (John). Short notices of three species of Trilobites from Silurian Beds of the Pentland Hills.

Trans. Edinburgh Geol. Soc., vol. 1, pt. 1, 1868, pp. 21-23.

The author mentions *Phacops Stokesii* and *Calymmene Blumenbachii*. He remarks that the species described as *Encrinurus expansus* by Haswell, in his Geology of the Pentland Hills, must not have been perfect, as he omitted any description of the free cheeks or facial suture. The author refers the *Zethus Pageii* Haswell to the free cheek of *Encrinurus expansus*. This species is broadly ovate, length about one and one-fourth of an inch; breadth two-thirds of the length, cephalic shield, semi-circular tuberculated posterior angles rounded; the glabella pear-shaped, convex, and covered with tubercles, and punctured between the tubercles; large tubercles, occupying the place of lateral lobes; cheeks triangular convex and embracing the front of the glabella; eyes pedunculated and placed between the centre of the cheek; and the glabella obovate and covered with a fine net work of facets.

——— Notice of *Silimonia acuminata* from the Silurian of the Pentland Hills.

Trans. Edinburgh Geol. Soc., vol. 1, 1870, pp. 18-19.

——— On some recently discovered fossiliferis beds in the Silurian rocks of the Pentland Hills.

Trans. Edinburgh Geol. Soc., vol. 3, 1880, pp. 353-356.

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Herrick (C. L.) Observations upon the so-called Waverly Group of Ohio.

Geol. Ohio, vol. 7, 1893, pp. 495-515, plates 14-24, Chapter IV.

Proetus praecursor Herrick. *Phaethonides spinosus* Herrick. *Phillipsia meramecensis* Shumard. *Proetus minutus* Herrick. *Phillipsia serraticaudata* Herrick. *Phaethonides immaturus* Herrick, *P. occidentalis* Herrick. *Proetus* sp. ?, *P. auriculatus* Hall.

This chapter is a summary of the results of observations published in the Bulletins of Denison University, the American Geologist, and the Bulletins of the American Geological Society.

The plates are from the Bull. Denison University.

Hind (G. J.) and **Fox** (H.) On Radiolarian rocks in the Lower Culm.

Quart. Jour. Geol. Soc., vol. 51, p. 609.

Trilobites by Dr. Henry Woodward, pp. 646-649.

Phillipsia Leei Woodw., *P. minor* Woodw. *Phillipsia* larval form.

Griffithides acanthiceps Woodw., *G. longispinus* Portl. *Proetus species* A-B.

Hitchcock (C. H.) Notice of a new species of Acidaspis from a boulder of Marcellus shale found in drift at West Bloomfield, New Jersey.

Bull. Am. Mus. Nat. Hist., vol. 19, 1903, pp. 97-98, plate 6.

The author describes *Acidaspis Whitfieldi* n. sp., which he compares with *Acidaspis mira* Barr., but the new species is rather more complicated in the distribution of the spines.

Hochsteetter (F.) Silursuiten (12 Gypsabgüssen seltener Trilobiten).

Verh. d. k. k. Geol. Reichsanst, Wien Jhg., 1877, p. 74.

Hoek (P. P. C.) Neues Jahrb für Min. Geol. and Pal., 1912.

Hoenes (R.) Die Trilobiten Gattung Phacops und Dalmanites.

Jahrb. k. k. Geol. Reich., 1880, vol. 30, part 4, pp. 657-686.

Ordovician: *Dalmanites Angelini* Barr., *D. atavus* Barr., *D. Deshayesi* Barr., *D. Hawlei* Barr., *D. Morrisiana* Barr., *D. orba* Barr., *D. Phillipsi* Barr., *D. socialis* Barr. and var. *proaeva* Emm., also var. *grandis*.

Silurian: *Dalmanites auriculata* Dalm., *D. cristata* Corda, *D. Fletcheri* Barr., *D. Hausmanni* Brongn., *D. McCoyi* Barr., *D. Reussi* Barr., *D. spinifera* Barr. *Phacops rugosa* Corda, *P. spinifera* Barr., *P. Glockeri* Barr., *P. Boecki* Corda, *P. breviceps* Barr., *P. Bronni* Barr., *P. bulliceps* Barr., *P. cephalotes* Corda, *P. emarginatus* Barr., *P. fecundus* Barr., *P. Hoeninghausi* Barr., *P. intermedius* Barr., *P. miser* Barr., *P. Signatus* Corda, *P. Sternburgi* Corda, *P. trapeziceps* Barr., *P. Volberthi* Barr.

The author discusses:

1. Characteristic of the genera *Phacops* and *Dalmanites;* similar and dissimilar features.
2. The group of *Dalmanites socialis* and their relationship to those of the *Dalmanites Hausmanni;* also to the genus *Phacops*.
3. The group of *Phacops Glockeri* as connecting link between *Phacops* and *Dalmanites*.
4. The probable evolution between the genera *Phacops* and *Dalmanites*.

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Holm (G.) Ueber eine neue Bearbeitung des *Eurypterus Fischeri* Eichw.

Acad. Imp. Sci. Bull., St. Petersburg, ser. 5, vol. 4, p. 369.

——— Om förekomsten af en Pterygotus i Dalarnes öfversilur.

Geol. För. i Stockholm Förhandl, vol. 19, 1897, p. 475.

Holm (Gerhard). Palaeontologiska Notiser 1-10.

Sveriges Gel. Unders. Afh., ser. C, No. 176, 1902.

Olenellus skifern vid Tomten Ringsaker's socken.

4. Om *Bohemilla ? denticulata* Linrs. och *Remopleurides microphthalmus* Linrs. This forms the type of *Robergia*, a new genus by Moberg, 1907.

6. Om forekomsten af en *Pterygotus* i Dalarnes Oversilur.

7. Om Angelin's *Bronteus ? nudus Illaenus (Bumastus) nudus.*

8. Om kinden hos *Illaenus punctillosus* Tornq.

9. On ett fullständigt examplar af *Pseudo-sphaerexochus laticeps* Linrs.

Illustrations of *Illaenus punctillosus* Tornq. *Pseudo-sphaerexochus laticeps* Linrs.

——— Palaeontologiska Notiser.

Geol. Foren. i Stockholm Forhandl, Bd. 19, p. 169, 1897.

Ueber Dikellocephalus and Olenellus Mickwitzi.

——— Palaeontologiska Notiser 13.

Geol. Foren. i Stockholm Forhandl, Bd. 21, Häft 1, 1899.

Om den yttre anatomien hos *Eurypterus Fischeri*, 4 plates.

——— Ueber die organisation des *Eurypterus Fischeri* Eichwald.

Mem. Acad. Petersburg, ser. 3, vol. 8, 1899, pp. 1-57, plates 1-10.

Eurypterus Fischeri Eichwald. *Dolichopterus laticeps* Fr. Schm.

The close similarity approaching identity of *Eurypterus Fischeri* to *E. remipes* and *E. lacustris*, American forms, suggested to Dr. Schmidt that the difference between the Baltic and American forms were only geographical variations arising through migration. With this idea Clarke and Ruedemann have concurred.

Holzapfel (E.) Das obere Mitteldevon in Rheinischen Gebirge. Berlin, 1895.

Proetus Cuvieri Stein, *P. Holzapfeli* Burhenne. Richter refers this to *P. cornutus* Goldf.

Cyphaspis ceratophthalma Goldf.

Houding (Van). Trilobieten und Limulus.

Album der Natuur, 1899, p. 24.

Hussak (E.) Ueber Trilobiten.

Jahresber d'Acad. Naturwiss ver Graz. Jahrg., 1875, pp. 35-36.

Illés von (A.) Magyarorszägon talält elsö Trilobita.

Foldtani Kozlony, vol. 22, 1902, pp. 351-354.

Griffithides Dobsinensis n. sp., figs a-b.

The author illustrated part of the thorax and pygidium; compares *Griffithides verrucosus* Gemmellaro, 1890.

——— Die erste in ungarn gefundene Trilobite.

Foldtani Kozlony, vol. 22, 1902, pp. 408-411, figs. a-b.

The same in the German language.

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Illing (V. C.) Notes on certain Trilobites found in the Stockingford Shales.

Brit. Assoc. Adv. Science, 83 Ann. Meeting, Sec. C, 1913.

Abstract in Geol. Mag., Dec. V, vol. 10, p. 452, 1913.

The author remarks that among the fossils found at Hartshill Hayes, numerous forms occur, representing young stages in the development of certain Trilobites. Among these are the following:

1. Liostracus sp., similar to one described by G. F. Matthew.
2. Holocephalina sp. The early stages of this genus possess a well-marked glabella, widening anteriorly.
3. *Paradoxides Hicksii.*
4. Certain new forms of Agnostus.

Jackel (O.) Ueber die Organisation der Trilobiten.

Zeitschr. Deutsch Geol., Ges. 53, 1901, pp. 133-171, plates 4-6.

——— Ueber verschhiedene Wege Phylogonetischer Entwickelung.

Verhandl. des V. Internationalen Zoologen Congresses zu Berlin, 1901, pp. 1058-1117, 28 figures in text.

Evolution of Trilobites, pp. 1086.

The author illustrates Phacops, Agnostus and Olenus, fig. Nos. 20-24.

On the evolution of Gigantostraca, p. 1105.

——— über die Agnostiden.

Zeit. d. Deutsch Geol. Ges., vol. 61, 1909, pp. 380-401, figures 1-23.

The author proposed Paragnostus with *Agnostus rex* as its type. This was the type of Corda's Condylopyge. He further proposed Dichagnostus with *Agnostus granulatus* as the type duplicating Corda's Pleuroctenium. The author gives the name of Mesagnostus for *A. integer* Beyr., which was used for Corda's genus Peronopsis.

Miagnostus Jackel has the same type species, *A. laevigatus* Dalm., as Lejopyge Corda. The new genus Leiagnostus, which has the same generic characters as Phalocroma Corda.

Metagnostus erraticus and *A. glabratus* have the same short glabella with faint basal lobes as *Agnostus tardus* Barr., which was the type of Corda's Arthrorhachis.

Vogdes, in Am. Geol., vol. 9, 1892, p. 395, in his paper on North American species of the genus Agnostus, uses this term for section IV.

The author arranges the families as follows:

1. Fam. Paragnostidae. Paragnostus n. gen., type *A. rex* Barr.
Dichagnostus n. gen., type *A. granulatus* Barr.
Diplagnostus, type *A. planicauda* Ang.
Mesagnostus n. gen., type *A. integer* Barr.
2. Fam. Metagnostidae.
Metagnostus n. gen., type *M. erraticus* n. sp.
Hypagnotus n. gen., type *A. parvifrons* Linnrs.
3. Fam. Agnostidae sensu stricto.
Agnostus sensu stricto, type *A. pisiformis* Linné.
Pseudagnotus n. gen., type *A. cyclopyge* Tullberg.
4. Fam. Leiagnostidae.
Ptychagnostus n. gen., type *A. reticulatus* Ang.
Miagnostus n. gen., type *A. laevigatus* Dalman.
Leiagnostus n. gen., type *L. erraticus* n. sp.

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Jahn (J. J.) Ueber das Tejrovicer Cambrium, Bohmen.

Verhandl. k. k. Geol. Reichs, 1893, p. 271.

Arionellus spinosus n. sp.

This species is illustrated by Pompeckj Die Fauna des Cambrium von Tejrovic, p. 548, pl. 17, figs. 14-20.

Jarosz (J.) Fauna des Kohlenkalk in der Umgebung von Krakau I Teil. Trilobiten.

Acad. d. Wissensch. in Krakau Math. Naturw., Kl., fur 1909, 2 Semester, Krakau, 1910.

Jones (T. R.) and **Woodward** (Henry). On some Scandinavian Phyllocardae, Part 2.

Geol. Mag., Dec. 3, vol. 5, 1888, p. 145.

Ceratiocaris Scharyi Barr., *C. pectinata* J. & W. *Phasganocaris pugio* Barr. var. *serrata* J. & W. *Ceratiocaris Angelini* J. & W.

——— Notes on Dr. G. F. Matthew's Cambrian Ostracoda from Northeastern America.

Geol. Mag., Dec. IV, vol. 9, 1902, pp. 401-403.

Outline figures of the genera—Indiana, Bradorona, Beyrichona, Hipponicharion, Bradoria and Escasona.

——— Note on a Palæozoic Cypridina from Canada.

Geol. Mag., Dec. V, vol. 1, 1904, pp. 438-439, fig.

Cypridina antiqua n. sp.

——— On some Isochilinae from Canada and elsewhere in North America.

Geol. Mag., new ser., Dec 4, vol. 10, 1903, pp. 300-304.

Isochilina gregraria (Whitf.), var. *Ulrichiana* nov. Tetradella. sp.

——— Some Palæozoic Ostracods from Maryland.

Johns Hopkins Univ., Circ., 1905, No. 3, pp. 20-33.

——— and **Kirby** (J. W.) Sur une Leperditia (Primitia) nouvelle du calcarire carbonifere de la Belgique.

Ann. Soc. Geol. de Belgique, vol. 20, 1893, plate.

The species described as *Leperditia Dewalquei* is now referred by authors to the genus *Primitia*.

——— Notes on Palæozoic Bivalved Entomostraca No. xxxii.

Ann. Mag. Nat. Hist., ser. VI, vol. 16, 1895, pp. 452-460, plate.

Bairdia Hisingeri Munster. *Bythocypris cornigera* J. & K. *Phreatura concinna* J. & K. *Cytherella intercalaris* n. sp. *Youngiella rectidorsalis* J. & K. *Bairdia plebeia* Reuss var. *alta* n. var., *B. Hisingeri* var. *contracta* n. var. *Argillaecia (Bythocypris) aequilis* J. & K. *Bythocypris breviata* n. sp.

——— Quelques Ostracodes fossiles de la Belgique.

Traduit par G. Dewalque, Liege, 1896, plate.

Leperditia Okeni Munster, *L. Okeni* var. *gracillis* n. var., *L. obtusa* n. sp., *L. consorbrina* n. sp., *L. Briarti* Dewalque. *Schmidtella belgica* n. sp. *Primitia Dewalquei* n. sp.

See also Ann. Soc. Geol. de Belgique, vol. 23, 1896.

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JONES (T. R.)—Continued

——— On the fossil Cypridinidae and some allied Ostracoda.

Ann. Mag. Nat. Hist., 7th ser., vol. 1, 1898, pp. 333-344, plate.

List of fossil Cypridinidae with illustrations of—

Cypridina primaeva McCoy. *Bradycinetus Rankianus* J. & K. *Philomedes ? Bairdiana* J. & K. *Cyprosina Whidbornei* Jones. *Cypridinella MacCoyiana* J. & K., *C. Burrovii* J. & K. *Cypridinella Koninckiana* Jones. *Cyprella annulata* DeKon. *Cypridina ? (Leperditia ?* von Toll.) Silurian, *C. ? polonica (Bolbozoe* Gurich), Upper Silurian, *C. Grayae* Jones, Lower Silurian, *C. Raisiniae* Jones, Lower Silurian.

——— Contributions to Fossil Crustacea.

Geol. Mag., Dec. IV, vol. 6, 1899, pp. 388-395.

Bellinurus grandaevus n. sp. *Leaia Leidyi* Jones. *Hibbertia orbicularis* gen. et sp. nov.

The genus is placed by the authors along with and nearer to those forms referred to the genus Cyclus than with any other group.

Anthrapalaemon glaber J. & W. *Echinocaris Whidbornei* J. &. W. *Estherina extuberata* n. sp.

——— The Eurypterus bearing rocks of the Pentland Hills.

Report Brit. Assoc., 1900, pp. 557-558.

——— **Bather** (R. A.), and **Chapman** (F.) On some fossils of Wenlock age from Mulde near Klinteberg, Gotland. With notes by Prof. Jones and Dr. Bather.

Ann. Mag. Nat. Hist., 7th ser., vol. 7, 1901, pp. 141-160, plate.

Family Leperditiidae: *Primitia valida* J. & H., also var. *breviata* J. & H. and var. *angustata* J. & H., *P. fabulina* J. & H., *P. elongata* Krause, *P. punctata* Jones, *P. humilis* J. & H., *P. ornata* J. & H., *P. reticristata* Jones, *P. mundula* Jones.

Sub-family Beyrichiinae: *Kloedenia apiculata* Jones, *K. gotlandia* n. sp.

Bollia auricularis Jones. *Beyrichia concinna* J. & H., *B. muldensis* n. sp., *B. Jonesii* Boll., *B. Kloedeni* McCoy, var. *tuberculata* Salter, *B. tuberculata* (Kloeden) var. *lineato-tuberculata* n. var., *B. Bolliana umbonata* Reuter, *B. clavata* Kolmodin.

Family Cytheridae?: *Cythere Vinei* Jones ?. *Cythere subquadrata* Jones. *Thlipsura plicata* var. *unipunctata* Jones, *T. v-scripta* J. & H. *Æchmina bovina* Jones and var. *punctata* Krause. *Primitiopsis planifrons* Jones.

Family Cyprididae: *Pontocypris Mawii* Jones., *P. Mawii* var. *proxima* Jones.

Family Bairdiidae: *Macrocypris siliquoides* Jones. *Bythocypris symmetrica* Jones, *B. symmetrica* var. *obesa* Jones, *B. phaseolus* Jones, *B. Hollii* Jones, *B. Hollii* var. *oblonga* Jones.

Family Cytherellidae: *Cytherella Smithii* Jones.

Trilobita: *Phacops (Dalmanites) limulurus Hall* (Green's sp.).

The authors illustrate *Beyrichia Muldensis, B. tuberculata* var. *lineato-tuberculata Kloedenia Gotlandica* n. sp.

Jonker (H. G.) Bijdragen tot de kennis der Sedimentaire Zwerfsteenen in Nederland. Contributions to a knowledge of the sedimentary erratic blocks in the Netherlands.

Amsterdam Verh. K. Akad., Wet. 2, part 12, No. 3, 1906, pp. 1-33, pl. 1.

Kayser (E.) Die Fauna des Hauptquartzits und zorger Schiefer des Unter-Harzes.

Abhandl. K. Preussischen Geol. Land., vol. 10, 1889, part 1.

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KAYSER (E.)—Continued

Phacops Potieri Bayle. *Homalonotus (Dipleura)* sp., *H. multicostatus* Koch?. *Cryphaeus Lethaeae* n. sp. *Cryphaeus* sp. *Phacops* aff. *fecundus* Barr.

——— Ueber einige neue order venig gekannte Versteinerungen des rheinischen Devon.

Zeitschr. Deutsch. Geol. Ges., vol —, 1889, pp. 288-926, plate.

Phacops (Trimerocephalus) acuticeps n. sp.

——— Die Fauna des Dalmanitensandsteins von Kleinlinden bei.

Giessen, Marburg, 1896, 42 pp., 5 plates.

Odontochile hassiaca n. sp., *O.* sp. *Phacops Frechi* Kays. *Cheirurus gibbus* Beyr. *Cyphaspis ceratophthalma* Goldf. *Bronteus (Thysanopeltis) laciniatus* Sandb.? *Phacops* cf. *Sternbergi* Corda.

——— Beitrage zur Kenntnis einiger Palæozoischer Faunen Sud Americas.

Zeitschr. Deutsch. Geol. Ges., vol. 49, 1897, pp. 274-317, plates.

Liostracus Steimanni n. sp., *L. Ulrichi* n. sp. *Agnostus irugensis* n. sp. *Olenus argentinus* n. sp. *Conocoryphe* (subgen.) *Crepicephalus.*

——— Weiterer Beitrage zur Kenntnis der älteren Palæozoischen Faunen Sud Amerikas.

Zeitscher. Deutsch. Geol. Ges., vol. 59, 1898, pp. 423-429, plate 16.

Megalaspis sp., *M. Brackebuschi* n. sp., *M. planilimbata* Ang. *Pterygometopus saltaensis* n. sp.

Thysanopyge argentina n. sp. et n. gen.

The new genus was established on a pygidium, similar to that of *Dalmanites caudata* and certain species of *Megalaspis.*

The main peculiarity of this new type consists of the tooth-edged limb of the pygidium, in other features it corresponds with the genus *Megalaspis.*

Keyes (Charles R.) Missouri Geol. Survey, vol. 4, part 1, 1894, Palæont. Missouri Crustaceans, Chap. X, p. 226.

Lichas Boltoni Bigsby. *Illaenus Graftonensis* M. & W., *I. insignis ?* Hall. *Acidaspis hamata* ? Conrad. *Cyphaspis Girardeauensis* Shumard. *Encrinurus deltoides* Shumard. *Dalmanites tridentifera* Shumard. *Acidaspis Halli* Shumard. *Calymmene senaria* Conrad, *C. rugosa* Shumard. *Ptychoparia conica* ? Billings. *Proetus Missouriensis* Shumard, *P. Swållovi* Shumard. *Phillipsia Sedaliensis* Vogd., *P. Sampsoni* Vogd., *P. tuberculata* M. & W., *P. Missouriensis* Shumard, *P. Meramecansis* Shumard, *P. Portlocki* M. & W., *P. major* Shumard, *P. ? immaturus* Herrick. *Leperditia sublaevis* Shumard. *Solenocaris Sancti-Ludovici* Worthen. *Colpocaris Chesterensis* Worthen.

Plate 32 illustrates *Illaenus insignis, Cyphaspis Girardeauensis, Dalmanites tridentifera Acidaspis Halli, Calymmene niagarensis Phillipsia tuberculata, P. Portlocki* and *P. major.*

Kindle (E. M.) and **Breger** (C. L.) The Stratigraphy and Palæontology of the Niagara of Northern Indiana. Geol. Sur. Indiana, 28 Ann. Report, 1903, p. 397.

Under the title of Trilobita the authors describe and illustrate (plate XXII-XXIV): *Illaenus armatus* Hall, *I. insignis* Hall, *I. ioxus* Hall. *Ceratocephala goniata* Warder. *Odontopleura ortoni* Foerste. *Encrinurus indianensis* n. sp. *Calymmene Vogdesi* Foerste. *Ceraurus (Crotalocephalus) niagarensis* Hall. *Sphaerexochus romingeri* Hall. *Phacops* cf. *pulchellus* Foerste. *Dalmanites (Synphoria) vigilans* Hall.

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The new species *Encrinurus Indianensis* of the Niagara Group has a semi-circular cephalon, test tuberculated. Glabella with 3 strong tubercles on each side, anterior to the occipital groove; fixed cheeks separated from the glabella by deep dorsal grooves; genal angles spined; pygidium elongated, triangular, convex; axis 15 joints; lateral ribs 10. Each ring of the axis has 3-5 tubercles, the median one being the strongest.

Compares *E. variolaris.*

Kindle (E. M.) The Onondaga Fauna of the Alleghany Region.

Bull. 508, U. S. Geol. Sur., 1912, 144 pp. with 13 plates.

The author notes and illustrates the following Crustacea:

Phacops rana Green, *P. cristata* Hall, with var. *pipa* Hall. *Cryphaeus* cf. *Boothi* var. *calliteles* (Kayser). *Dalmanites (Coronura) aspectans* Conrad. *Odontocephalus selenurus* (Eaton), *O. aegeria* Hall. *Phaethonides gemmaeus* H. & C. *Conolichas* cf. *hispidus* H. & C. *Cyphaspis* cf. *stephanophora* H. & C. *Lichas (Arges) contusus* H. & C. var. *Acidaspis callicera* H. & C. *Dalmanites* sp. undet.

Ostracoda: *Bollia ungula* Jones, *B. obesa* Ulrich. *Bythocypris favulosa* Jones. *Ulrichia conrandi* Jones. *Octonaria stigmata* Ulrich. *Leperditia* cf. *subrotunda* Ulrich.

The above list of 13 species contains three trilobites known in the Hamilton fauna. One, *Phaethonides gemmaeus*, is common to the Onondaga and Hamilton faunas in New York. The doubtful species *(Cryphaeus* cf. *boothi* var. *callites)* has an occurrence at a horizon, earlier than the Hamilton now first reported. The third *Phacops rana* is one of the very few Devonian trilobites having a wide range.

Kingsley (J. S.) The systematic position of Trilobites.

Amer. Geol., vol. 20, 1897, pp. 33-40.

The author remarks, on p. 34: "Not a single homology can be drawn with any degree of certainty between Limulus and any trilobite. The regional divisions are different; the appendages are built upon a different plan, while the larvae of the two groups present but the slightest and most superficial resemblance to each other."

Kliver (M.) Über einige neue Blattinarien, zwei Dictyoneura und zwei Arthropleura Arten aus der Saarbrücker Steinkohlenformation.

Palæontographica N. F. IX, pp. 251-265, pl. 34-36, 1883.

Arthropleura armata Jord.

Koenen (A. von). Ueber die Organisation der Trilobiten.

Marburger Sitzber, 1872, pp. 77-78.

Verhandl. d. Naturhist. Ver. d. Preuss. Rheinl. and Westphal. 29 Jhg. (3F. 9 Jhg.). 1872, pp. 93-95.

——— Ueber die Underseite der Trilobiten.

Neues Jahrb. für Mineral, Jhg., 1880, vol. 1, pp. 430-431.

Koninck (L. G.) de Description of the Palæozoic Fossils of New South Wales (Australia). Translated by Prof. T. W. Edgeworth David, Mrs. David and W. S. Dunn.

Memoirs Geol. Survey N. S. Wales Palæontology, No. 6, xii, 298 p., 24 plates, 1898.

For list of Crustacea see Mem. Sci. Liége, vol. vii, 1878; also Bibliography of the Palæozoic Crustacae, Vogdes, p. 128.

Krause (A.) Ueber die Ostrakodenfauna eines holländischen Silurgeschietes.

Zeitschr. Deutsch. Geol. Ges., vol. 48, Jahg., 1896, p. 932, plate XXV.

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Isochilina cf. *canaliculata* Krause. *Primitia distans* Krause, *P.* cf. *bursa* Krause. *P. Schmidtii* Krause, *P. elongata* Krause, *P. elongata* var. *obliqua* Steusloff, *P. binodis* n. sp., *P.* cf. *canaliculata* Steusloff. *Entomis* cf. *sigma* Krause, *E.* cf. *obliqua* Krause, *E. oblonga* Steusloff, *E. imperfecta* n. sp. *Placentula Jonesii* n. sp. *Bollia minor* Krause var. *ornata* n. var. *Tetradella harpa* Krause. *Ctenobolina rostratae* Krause, *C. rostrata* var. *cornuta* n. var. *Bythocypris* cf. *symmetrica* Jones.

Krejci (J.) O trilobitech.

Ziva 11, 1854, pp. 83-89, plate 3.

Dalmanites socialis Barr. *Trinucleus ornatus, Acidaspis mira.*

Kutgen (Carl). Die Trilobiten des K. G. H. naturhistorischen Museums.

Publicat de 1, Instit. Roy. grand-ducal Luxembourg, Sec. Sci. Nat. vol. 16, 1877, pp. 127-142.

Proetus Cuvieri Steininger. *Phacops latifrons* Bronn. *Dalmanites caudata* Emm. *Homalonotus platynotus* Dalm., *H. delphinocephalus* Murch., *H. laticauda, H. Knightii* Koenig, *H. obtusus* Sandb., *H. crassicauda* Sandb. *Calymmene Blumenbachii* Brong.

Lake (Philip). On the British species of Acidaspis.

Quart. Jour. Geol. Soc. London, vol. 52, pp. 235-245, plates 7-8.

The author describes and illustrates the following species:

Acidaspis Brighti Murch., *A. coronata* Salter, *A. deflexa* n. sp., *A. crenata* Emm., *A. quinquespinosa* Salt. MS., *A. Barrandei* Fletcher & Salter non Angelin, *A. Hughesi* Salt. MS., *A. erinaceous* Marr & Nicholson, *A. callipareos* Wyv. Thomson.

The author remarks the British species which have been described have in many cases been imperfectly figured, and the result is endless confusion.

The common English trilobite *Acidaspis coronata* has received abroad no less than three names, all of them different from ours. In England the foreign name *Acidaspis crenata* is often applied to a species which is quite distinct from the original *Acidaspis crenata.*

The author remarks in regard to the synonymy of *Acidaspis coronata* that it is known in England by the name of *A. coronata,* as *A. Marklini* in Sweden, and *A. mutica* in Germany; Murchison's term *quadrimucronatus* is older than any of them.

Even the name of the genus itself is matter of controversy. Murchison's Silurian System, p. 653, employed the term Acidaspis, and in the same year Emmrich, De Tril. Diss. inaug., p. 53, proposed the name Odontopleura. This controversy depends on the publication of Murchison's and Emmrich's terms Acidaspis and Odontopleura.

A copy of Murchison's Silurian System was presented to the Geological Society London, Jan. 9, 1839. This would indicate that the book was published early in January, 1839. Captain Portlock, in his address delivered at the 8th annual meeting, Geological Society of Dublin, Feb. 14, 1839, remarks he had been favored with a copy of the work in sheets, prior to its general publication. Jour. Geol. Soc. Dublin, vol. 2, pt. 1, 1839, p. 29.

Emmrich's paper bears the date, April, 1839.

There is, however, an earlier name still, the use of which has been advocated by Vogdes (Proc. Nat. Sci. Phila., 1877, p. 138); also afterwards by Clarke (10th Rep. N. Y. State Geologist, 1891, p. 61). This name is Ceratocephala Warder (Am. Jour. Sci., vol. 34, 1838, p. 377). Dr. Lake remarks that "even if its rival be eligible, Acidaspis has been so widely used for so long a time that here at least I do not propose to adopt any other."

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LAKE (Philip)—Continued

Warder's species *Ceratocephala goniata* belongs to the same group as *Acidaspis vesiculosa* Barrande.

Beyrich's *Odontopleura Brightii* is identical with *A. quinquespinosa* Salter MS.

——— The Trilobites of the Bokkeveld Beds.

Ann. South African Mus., vol. 4, part 4, 1904, pp. 201-220, 5 plates.

Phacops pupillus n. sp., *P. arbuteus* n. sp., *P. crista-galli* Woodw., *P. africanus* Salter, *P. ocellus* n. sp., *P. impressus* n. sp., *P. (Cryphaeus) caffer* Salter. *Phacops* sp. *Dalmanites lumatus* n. sp. *Dalmanites* sp. *Proetus malacus* n. sp. *Typhoniscus Baini* Salter. *Homalonotus Herscheli* Murch., *H. quernus* n. sp., *H. colossus* n. sp. *Homalonotus* sp.

Several of these species were described by Salter, Trans. Geol. Soc., series 2, vol. vii, 1856; also by Henry Woodward, Quart. Jour. Geol. Soc., vol. xxix, 1873; and by Dr. Frech, who describes a *Homalonotus* which he believed to be new, in Lethaea Geognostica Th. 1, Bd. ii, Leif. 1, 1897, p. 218. *H. perarmatus* n. sp.

——— On Trilobites from Bolivia.

Quart. Jour. Geol. Soc. London, vol. 42, 1906, pp. 425-430, plate XL.

Peltura sp. *Symphysurus apolonista* n. sp. *Trinucleus boliviensis* n. sp. *Ogygia. Phacops* cf. *arbuteus* Lake. *Dalmanites Paituna* H. & R., *D. maecuruia* Clarke. *Dalmanites* sp.

The earlier genera show affinities with the contemperaneous European fauna.

The Devonian species are much more closely allied to those of South Africa and North America.

——— The Cambrian Trilobites.

A Monograph on the British Cambrian Trilobites. Palæontographical Society, 1906, part 1, pp. 1-28, plates 1-2.

Agnostus fissus Lundgren, *A. punctuosus* Ang. (The *Agnostus scarabaeoides* Salter, as described by Hicks, is clearly only a flattened and imperfect specimen of this species.) The *Agnostus scutalis* Hicks. Quart. Jour. Geol. Soc., vol. 28, pl. v, f. 9, is a beautiful tail of *A. punctuosus* Ang.

Agnostus Davidis Salt., *A. exaratus* Gronwall. (The *Agnostus scutalis* as described by Hicks, Quart. Jour. Geol. Soc., vol. 28, p. 175, pl. v, figs. 12 and 13, and probably figs. 11 and 14, not figs. 9 and 10, includes at least two distinct species. The descriptions of the heads corresponds with Gronwall's species, but the tail is apparently based on a specimen of *A. punctuosus.)*

Agnostus reticulatus Ang., *A. pisiformis* Linne, *A. pisiformis* var. *obesus* Belt, *A. trisectus* Salt., *A. altus* Gronwall, *A. Barrandei* Salt., *A. rotundus* Gronwall, *A. nudus* Beyr., *A. Eskriggei* Hicks, *A. Barlowi* Belt.

Section Limbati: (a) Regii *Agnostus cambrensis* Hicks. (b) Fallaces *Agnostus integer* Beyr., *A. securiger* n. sp., *A. fallax* Linnrs., *A. rudis* Salt., *A. sidenbladhi* Linnrs., *A. calvus* n. sp., *A. dux* Callaway, *A. Callawei* Raw MS., *A. cyclopyge* Tullberg, *A. obtusus* Belt.

Section Parvifrontes: *Agnostus truncatus* Brogger.

——— A Monograph of the British Trilobites.

Part 2, Palæontological Society, 1907, pp. 29-48, plates 3-4.

Agnostus incertus Brogg. *Microdiscus* Salter (non Emmons).

The genus *Microdiscus* was first established by Emmons Am. Geol., vol. 1, pt. 2, p. 116, pl. 1, fig. 8, for a small trilobite to which he gave the name of *Microdiscus quadricostatus,* which Dr. Lake refers to *Trinucleus* and takes Salter's *Microdiscus punctatus* for the type of the genus.

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LAKE (Philip)—Continued

Microdiscus lobatus Hall, *M. speciosus* Ford, *M. punctatus* Salter, refers *M. scanicus* Linnrs., *M. eucentrus* Linnrs. to this species. *Microdiscus Sculptus* Hicks. *Shumardia pusilla* Sars (refers *Conophrys salopiensis* Callaway to this species). *Shumardia miqueli* Pompecki, *S. bottnica* Wiman. (*Acanthopleurella Grindroni* Groom, to this species.) *Shumardia pusilla* var. *morvensis* n. var. *Shumardia* sp. *Orometopus elatifrons* Ang. Refers this genus to the family Trinucleidae as a primitive form. *Orometopus praenuntius* Salter (Ampyx Salter, Mem. Geol. Sur., vol. 3, p. 321, pl. 8, fig. 5).

——— A Monograph of the British Trilobites.

Part III, Palæont. Soc. London, 1908, pp. 49-64, plates V-VI.

Olenus truncatus Brünnich, *O. gibbosus* Wahl., *O. micrurus* Salt., *O. cataractes* Salt., *O. mundus* n. sp., *O. longispinus* Belt. *Parabolina Spinulosa* Wahl. *Parabolinella Williamsoni* Belt.

——— A Monograph of the British Cambrian Trilobites.

Part 4, pp. 65-88, plates vii-x, Palæontographical Society, 1912.

The author describes and illustrates *Parabolinella caesa* nov.; compares it with *P. williamsoni*, to which it is closely allied.

Parabolinella rugosa Brögger var., *P. triarthra* Callaway, described by that author under the genus Olenus in 1877.

Triarthrus shinetonensis Raw. The species named by Raw, Rep. Brit. Assoc. for 1907, p. 512, without a description or figure.

The author compares it with *T. spinosus* Billings.

Dr. Ami, Trans. Ottawa Field Nat., vol. 1, No. 4, 1882-83, indicates that *Triarthrus spinosus* Billings, had spines on the 8th to 13th segment of the thorax. The English species has 14 segments in the thorax, with the 12th axis ring spined.

Genus Sphærephthalmus Angelin.

The author remarks that the genera Leptoplastus, Sphærophthalmus, Ctenopyge and Eurycare, form a natural group of the Olenidae, characterized by the fact, that the cheek spines do not spring from the posterior angles of the head, but from the middle of the external margin or even from the lateral angles.

Brögger considers that all these forms should be placed in a single genus, which he calls Leptoplastus, divided into four subgenera.

The author describes *Sphaerophthalmus alatus* Boeck. This species is the same as *Olenus humilis* Phillips, 1848, according to Linnarsson's investigations of original specimen.

Sphaerophthalmus major nov.

Ctenopyge: The author does not agree with Brögger and Moberg that only the axial rings are fused, while the pleurae are free. The pleurae seem to be closely connected and rarely show any signs of separation.

The author describes *Ctenopyge fusiformis* nov., *C. bisulcatus* Phillips. Salter, taking *Angelin's Sph. alatus* figure as his guide, indicating it with *Olenus bisulcatus* Phillips; therefore this species in English publications means *Ctenopyge bisulcata* or some similar form. *Ctenopyge falcifera* nov., *C. pecten* Salter, *C. expansa* Salter, *C. teretifrons* Angelin, described under the generic name of Sphaerophthalmus.

Lambert (A. E.) Description of *Dalmanites lunatus*.

Bull. Geol. Soc. America, vol. 15, p. 480, plate 44, 1904.

Lapparent (A.) De Note sur un gisement de Trilobites decouvert par M. Maurice Gourdon aux environs de Luchen.

Bull. Geol. Soc. France, 3rd ser., vol. 8, 1879-1880, pp. 47-48.

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Lapworth (Charles). On the discovery of the Olenellus fauna in the Lower Cambrian Rocks of Britain.

Geol. Mag. Dec. 3, vol. 5, 1888, p. 484; also p.190, vol. 6, 1889.

The author remarks: "The remarkable fauna of the Olenellus or lowest Cambrian zone originally discovered in America by Dr. Emmons in 1844 (the Taconic system based on observations in New York, Massachusetts, Maine, Vermont and Rhode Island, Albany, 1844, p. 21, *Elliptocephala asaphoides,)* was first recognized in Europe by the late Dr. Linnarsson in 1871 (Ofversigt af Kongl. Vetenskaps Akad. Forhandl, No. 3, p. 790, *Paradoxides Kjerulfi),* in the basal zones of the Cambrian near Lake Mosen in Norway, but its typical genus Olenellus was then referred by him to the allied but more recent genus Paradoxides.

This reference was corrected by Prof. Brögger in 1875 (Geol. Förening Stockholm Förhandl., vol. 2, 1875, p. 573), and the various brilliant papers on the primoidilal formations by this author have given the Olenellus fauna a marked and peculiar interest.

In 1882 Linnarsson next made known the existence of the Olenellus fauna in Scania at the base of the Swedish Cambrian. In 1886 the same fauna was detected by Mickwitz in the Lower Cambrian of Russia (Esthonia) and this Russian fauna has been lately figured and described by Dr. Schmidt. Dr. Holm has signalized the existence of the Olenellus fauna in the Cambrian of Lapland, where it was detected by Morstell in 1885.

The original discovery of the Olenellus zone in Europe was made by Dr. A. G. Nathorst in 1868. This species, *Olenellus Kjerulfi,* was named *Paradoxides Wahlenbergi,* Torell Petrefacta Suecana from Cambrica, 1869-70, p. 4, but he did not describe or figure the new form; therefore, *O. Kjerulfi* must be retained for the name of the species.

Laurie (M.) The Embryology of the Scorpion.

Micr. Sci. Quart. Jour. ser., vol. 31, 1890, pt. 2, p. 105.

Euscorpitus italicus.

——— On some Eurypterid remains from the Silurian Rocks of Pentland Hills.

Trans. Roy. Soc. Edinb., vol. 37, 1892, p. 151.

Stylonurus ornatus nov., *S. macrophthalmus* nov. *Eurypterus Scorpiodes* Woodw., *E. conicus* nov., *E. cyclophthalmus* nov. *Drepanopterus pentlandicus.*

——— Recent additions to our knowledge of Eurypterida.

Nat. Sci., vol. 3, 1893, p. 124.

——— The Anatomy and Relations of the Eurypteridae.

Trans. Roy. Soc. Edinb., vol. 37, 1893, p. 509.

——— On some Eurypterid remains from Upper Silurian Rocks of the Pentland Hills.

This author has described in a paper before the British Association, 1892, p. 729, and the Royal Society of Edinburgh between the years 1892 and 1899, Trans, Roy. Soc. Edinb., vol. 38, pt. 1, p. 151, 1893, and vol. 39, .1890, p. 575, four new species to the genus Eurypterus, three to Stylonurus, and makes a new species of Silmonia. He is compelled to make two new genera to receive some more generalized forms. One of these, Drepanopterus, comprising three species, combines characters found in Stylonurus and Eurypterus; and for one species with very generalized characters he makes the genus Bembicosoma.

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LAURIE (M.)—Continued

Stylonurus ornatus nov., *S. macrophthalmus* nov., *S. elegans, S. bembicoides. Eurypterus scorpoides* Woodw., *E. conicus* nov., *E. cyclophthalmus* nov., *E. dolichoschelus* nov., *E. minor* nov. *Drepanopterus pentlandicus* nov., *D. bembicoides, D. lobatus. Slimonia dubia* nov. *Bembicosoma pomphicus* nov.

——— On a Silurian Scorpion and some additional Eurypterid remains from the Pentland Hills.

Trans. Roy. Soc. Edinburgh, vol. 39, pt. 3, p. 575, 1899.

Clarke and Ruedemann remark on this genus that as Eusarcus and the Siluric scorpions are so much alike in their body form they may be assumed to have had similar habits.

Lee (G. W.) A Carboniferous fauna from Nowaja Semlja, collected by Dr. W. S. Bruce, with notes on Corals by R. G. Carruthers.

Trans. Roy. Soc. Edinburgh, vol. 47, pt. 1, 1909, pp. 143-186, 2 plates.

Carboniferous Ostracoda:

Phillipsia Eichwaldi ? *Leperditia okeni* Münster. *Bairdia curta* McCoy. *Cytherella* ? *inflata* Münster.

——— Note on Arctic Palæozoic fossils from the Hecla and Fury collections.

Proc. Roy. Soc. Edinburgh, vol. 18, No. 4, 1912, pp. 244-264, text figs.

Ostracoda: *Leperiditia phaseolus, L.* aff. *balthica* var. *guelphica, L.* cf. *caeca.*

Leriche (Maurice). La faune du Gedinnien inferieur de l'Ardenne.

Mem. Mus. Belgique, Bruxelles, vol. 6, 1912, pp. 1-58, plates 1-3.

Ostracoda: *Beyrichia Kloedeni Primitia Jonesi. Homalonotus Roemeri* and *Acaste Downingiae.*

The author refers *H. Vialai* Gosselet, 1912, to this species.

Leyh (C. Fr.) Beiträge zur Kenntniss des Paläozoicum der Umgegend von Hof a Saale.

Zeitschr. Deutsch, Geol. Ges., 1897, Bd. 49, pp. 504-560, plates 17-18.

The author describes *Dechenella hofensis* n. sp. *Proetus angustgenatus* n. sp. *Phillipsia* cf. *aequalis* H. V. Meyer, *P. Glassi* n. sp., *P. pustulata* Schloth. *Griffithides longicornutus* n. sp., *G. articulatus* n. sp., *G. pupuloides* n. sp., *G. Moroffi* n. sp. *Phillipsia* sp.

Ostracoda: *Beyrichia* aff. *intermedia* J. & H. *Leperditia Okeni* Münst., *L. parallela* J. & K., *L. suborbiculata* Münst. *Cytherella* aff. *inflata.*

Lima (Wenceslau de). Note sur un nouvel Eurypterus du Rothliegendes de Busaco.

Comm. da Commissäo des Trablhos Geol. de Portugal, Tom. 2, 1890, pp. 153-157, plate.

Lindström (G.) Förteckning pä Gotlands Siluriska Crustacéer.

Öfversigt af Kongl. Vetenskaps-Akad Forhandlingar, 1885, No. 6, pp. 37-100, plates 12-16.

Reviewed Geol. Mag., Dec. 3, vol. 3, 1886, p. 33.

The author describes under Phacops subgenus Dalmanites:

Phacops vulgaris Salt., *P. imbricatula* Ang., *P. obtusa* nov. Subgenus Phacops. *Phacops Downingiae* Murch., *P. quadrilineata* Ang., *P. Musheni* Salt. *Chirurus speciosus* His., *C. conformis* Ang., *C. bimucronatus* Murch., *C. gotlandicus* nov. *Sphaerexochus*

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LINDSTROM (G.)--Continued

scarbridus Ang., *S. latifrons* Ang., *S. lacinatus* nov., *S. Beyrichi* nov. Youngia new genus genotype *Cheirurus trispinous* Etheridge and Nicholson.

Cephalon semi-circular with long spines to the genal angles; glabella sub-circular convex truncated posteriorly by occipital furrow overhanging front 3 pairs of lateral furrows to the glabella; occipital ring with long spine; fixed cheeks, small, short, narrow. Pygidium not known.

The author describes as new *Youngia globiceps* and *Y. inermis Deiphon Forbesi* Barr. *Encrinurus punctatus* Wahlen., *E. laevis* Ang., *E. obtusus* Ang. *Acidaspis crenata* Emm., *A. Barrandei* Ang., *A. Marklini* Ang., *A. pectinata* Ang., *A. (Trapelocera) bicuspis* Anglin. *Lichas concinnus* Ang., *L. latifrons* Ang., *L. palifer* nov., *L. araneus* nov., *L. ornatus, L. marginatus* nov., *L. visbyensis* nov., *L. plicatus* nov., *L. triquetrus* nov., *L. rotundifrons* Ang., *L. gotlandicus* Ang. *Trochurus Salteri* Fletcher.

The generic name of Trochurus was used by Beyrich Böhm, Tril., 1845, p. 31, for a composite and artificial species consisting of the head of *Staurocephalus Murchisoni* and the tail of *Lichas palmata* Barr., which the author recognized in the Untersuch uber Tril., 1846, p. 10, and declared that the genus did not exist. The name was revived by Lindström in a wider and slightly different sense, giving *Lichas Salteri* as the type, including *Trochurus pusillus* Ang. *Harpes acuminatus* nov.

Calymmene tuberculata Brunnich, C. spectablis Ang., C. laevis nov., preoccupied by Munster of a species of Calymmene which is now referred to Phacops *(C. Lindströmi* nov.*) Calymmene frontosa* nov., *C. intermedia* nov., *C. excavata* nov., *C. papillata* nov. *Homalonotus Knighti* König. *Phaetonides Stokesi* Murch., *P. rugulosus* nov., *P. longifrons* nov. *Cyphaspis elegantula* Ang., *C. punctillosa* nov. *Proetus concinnus* Dalm., *P. obconicus* nov., *P. distans* nov., *P. acutus* nov., *P. conspersus* Ang., *P. signatus* nov., *P. granulatus* nov., *P. verrucosus* nov. *Illaenus* subgen. *Bumastus barriensis* Murch., *B. Holmi* nov., *B. sulcatus* nov. for *Illaenus insignis* Holm. *Bronteus platyactin* Ang., *B. Marklini* Ang., *B. polyactin* Ang., *B. irrandians* nov., *B. umbonatus* nov., *B. crebristriatus* nov.

Merostomer: *Eurypterus Fischeri* Eichw. *Pterygotus osiliensis* Schm.

——— Ueber die Schichtenfolge des Silur des Insel Gotland.

Neues Jahrb. Min. Geol. Pal., Bd. 1, 1888, pp. 147-164.

——— Researches on the visual organs of the Trilobites.

Kongl. Svenska Vetenskaps Akad. Handlingar Bandet 34, No. 8, 1901.

Dr. Lindstrom considers certain nodes on the hypostoma to be visual organs. This is based on the discovery of Dr. Liljevall from the hypostoma of *Bronteus polyactin* Ang. They are located on the inferior edge of the upper groove, close to the lateral margins. To these tubercles he gives the name of "maculae". They are oblong or ellipsoid; their inferior apices bluntly pointed or rounded, two-thirds of their surface is perfectly smooth or glossy, and the lower one-third covered with a compact accumulation of small granules, similar to the facets of the compound eyes of Trilobites. The author, therefore, assumes that they are a pair of small adventive eyes on the exterior side of the hypostoma, from the perfect structural agreement between them and the eyes of the head. The author sums up the literature on blind trilobites without facial ridge; also those with facial ridge, and illustrates the maculae on the hypostoma of 39 genera and 136 species.

The different genera are divided into six groups as follows:

Group 1—In the sectioned maculae there is no tract of any structure. The test of the maculae considerably thinner than that of the hypostoma. According to the affinites of the genera they may be subdivided as follows. a—*Bumastus, Dysplanus.* b—

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LINDSTROM (G.)—Continued

Nileus, Symphysurus, ? *Ogygia.* c—*Calymmene, Homalonotus.* d—*Cheirurus* pro parte.

Group 2—The whole maculae is of a spongious or irregularly polyhedric structure showing prisms in vertical sections. *Asaphus, Isotelus, Megalaspis, Ptychopyge, Niobe? Megalaspides? Barrandia, Illaenus Lichas, Trochurus? Platymetopus Encrinurus* also probably belongs to this group.

Group 3—Maculae with well-developed globular lens on the interior third of the maculae; the blank part of the maculae without any structure. In such species as *Cheirurus spinulosus* the whole maculae covered with lenses. *Bronteus, Cheirurus spinulosus.*

Group 4—The maculae form sunk pits, with smooth bottom. Structure unknown. *Dalmanites.*

Group 5—The elongate, straight maculae, carrying on their innermost point from 3 to 5 diminutive segregate ocelli, situated on a clear, white patch. *Proetus.* These ocelli have not been observed on the related genera Cyphaspis, *Phaetonides, Phillipsia* and *Griffithides,* but they may be preliminarly ranked here in consequence of their close conformity.

Group 6—The maculae have in this group been reduced to a pair of tiny ocelli, situated high up on the hypostoma, near its anterior margin. *Phacops, Acaste.*

Loomis (F. B.) The dwarf fauna of the pyrite layer at the horizon of the Tully limestone in Western New York.

Bull. New York Mus., No. 69, pp. 892-920, plates iv, 1903.

Cryphaeus Boothi var. *calliteles* Greene, *Beyrichia dagon* Clarke. *Entomis prosenhina* n. sp.

Lorenz (Th.) Beiträge zur Geologie und Palæontologie von Ostasien unter besonderer Berücksichtigung der Provinz Schantung, in China. 2 Palaeontologischer Teil.

Zeitschrift der Deutsch. Geol. Ges., 1906, pp. 67-122, with 3 plates and 55 figures in text.

The author attaches classificatory importance to the minute structure and superficial ornamentation of the test, which has led him to change the generic allocation of many well known species, and to institute many new genera.

Lorenz, on account of the different structure or ornamentation of the test, divides the group Conocephalites into two genera: Conocephalina and Concephalites, but the type *C. Emmrichi* Barr. of the latter he puts into the former, thereby making needless confusion. Conocephalina Brögger has as its type *C. ornata* Brögger, and the author has referred to it several English species placed by Salter in Conocephalites, such as *C. invita.*

The author illustrates *Ptychoparia striata* Em. and places the genus Solenopleura as a synonym to Ptychoparia, figuring *Solenopleura brachymetopus* Angelin.

The author remarks in regard to the new genus Lioparia, that it has medium-sized eyes, in common with both Ptychoparia and Liostracus; likewise the deep dorsal furrow of Ptychoparia. In relation to the shell structure and the flat selvage, it is on the side of Liostracus. On careful consideration one must admit that Liostracus is in closer relation to the species Lioparia, than that of the genus Ptychoparia.

He refers *Conocephalites minutus* Hall to the genus, and uses *Lioparia latelimbatum* Dames, with one new species, *L. blautoeides,* as the type of the genus.

Trachyostracus new genus: Is distinguished by medium-sized wide-apart eyes, flat selvage and little or no dorsal furrows. In its outer form it is not to be distinguished from Liostracus. The difference in the genera lies alone in the different shell struc-

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LORENZ (Th.)—Continued

ture. Trachyostracus has a thick, rough shell; Liostracus a smooth, finely porous shell. These two genera exhibit a rare case of convergence.

Examples of this species are the two following forms: *Solenopleura Howleyi* Walc. and *Ptychoparia limbata* Matt.

Under Liostracus Angelin, as emend. by Brögger, the author includes *Liostracus microphthalmus* Ang., fig. 4. *Ptychoparia Piochensis* Walcott. *Anomocare planum* Dames. *Liostracus Linnarssoni* Brögger, *L. aculeatus* Ang.

Macrotoxus n. gen.: The principal characteristics consist in the very long arch-shaped eyes, the deep dorsal furrows and the thick, rough shell. The author refers *Anomocare Angelini* Grönwall and *Conocephalites perseus* Hall to the genus.

Alokistocare new genus: This genus has in common with Macrotoxus the long, arch-shaped eyes, and the long dorsal furrow around the glabella. By its porous shell it is differentiated from the former. The author refers *Ptychoparia subcornata* H. & W. to this genus.

Megalophthalmus new genus: Also here are the long, arch-shaped eyes the principal element. The glabella does not lie deeply in the head shield, but comes out high over the cheeks. Even trace of dorsal furrows is lacking. The shell is thick, rough, not porous.

The author refers *Liostracus megalurus* Dames and *Anomocare minus* Dames to this new genus, remarking that it is not improbable that this group is also distributed in North America. In its external appearance it resembles throughout the old Swedish species of Anomocare. The last, however, has a highly porous shell.

Under the genus Anomocare the author includes *Anomocare latelimbatum* Dames, *A. excavatum* Ang., *A. limbatum* Ang. *Liostracus Maydelli* Schmidt, *Anomocare commune* n. sp. and *A. laeve* Ang.

The author places Conocephalina Brögger and Conocephalites Barrande, under two groups, on the difference of the ornamentation of the test, using *Ptychoparia Emmrichi* for the type of the first genus, with granulated shell; and *Concephalites ornatus* Brögger for the second genus, although Brögger used this for his type.

The author figures *Ptychoparia Emmrichi* Barr. also *Conocephalites ornatus* Brögger and *C. suecicus* Wallerius.

The author gives the following description of the new genus *Amphoton* with the species *A. Steinnanni* for its type:

Glabella narrow, highly cylindrical, with deep furrows. On both sides of the high glabella wing-shaped, similuna-shaped cushions, that resemble ears on a great elephant head. The eyes are long, box-shaped and stand upright. The anterior eye corners lie close to the glabella. The facial sutures follow the eye lobes, diverging slightly from the anterior eye corners to the frontal margin. From the rear eye corners it branched outwardly into a horizontal piece before it cuts through the rear margin; thereby forms a small band attached to the rear of the cheek. Close to the front end of the glabella is a narrow, flat, bent-up edge. The pygidium greatly resembles that of Anomocare, for in a slab of fossils from Laiwa, are found numerous head shields of this species, corresponding to head and tail shields of Anomocare.

On page 91, the author describes *Anomocare commune* n. sp. (referred by Walcott to *Anomocarella chinensis* Walcott); also *Anomocare ovatum* n. sp. and *A. speciosum* n. sp. (referred by Walcott to the genus Anomocarella).

The author includes a description of Olenus sp. Ptychoparia (Solenopleura) sp., and the description of a new genus Schantungia, with *S. Buchruckeri* for its type (this has been referred by Walcott to *Chuangia nitida)*.

The other fossil crustacea described in this work are: *Schantungi Monkei* n. sp. *Liostracus latus* n. sp. *Agnostus fallax* Linrs. var. *Laiwuensis* n. var., *A. parvifrons*

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LORENZ (Th.)—Continued

Linrs. var. *latelimbatus* n. var. *Asaphus Boehmi* n. sp. *Lioparia latelimbata* Dames (*Anomocare latelimbatum* Dames) *Teiniston* sp. *Drepanura* sp. and hypostoma of Anomocare.

Lucas (H.) Otarion et Paradoxide.

Articles du Dictionaire Universal d'Hist. Nat., dirigé par Ch. d'Orbigny, 1847.

Macconochie (A.) Discovery of Organic remains in the Old Red Sandstone of Lorne.

Summary of Progress for 1897, Mem. Geol. Sur. of Great Britain, pp. 82-83.

Macnair (P.) The geology of the Rouken Glen and its neighbourhood.

Glasgow Trans. Geol. Soc. 12, 1906, pp. 362-397, pl. ix-x.

Mailleux (Eugene). Quelques mots sur les Trilobites du Couvinien des environs de Couvin.

Bull. de la Soc. Belge de Geol., vol. 17, 1904, pp. 579-585.

The author describes a new species of *Proetus Barroisi* with figures; also gives a list of species occurring near Couvin.

Mansfield (J. F.) Note on Eurypterus from the Darlington Shales, Penn.

Am. Philos. Soc. Proc., vol. 19, 1881, p. 352.

This species is classified by Clarke and Ruedemann under the subgenus Anthraconectes.

Mansuy (H.) Etude géologique du Yun Nan oriental lle partie Palaeontolog.

Mem. service geol. l'Indo-Chine, vol. 1, 1912, pp. 1-146, pl. 1-25.

The author describes the following crustacae:

Ostracods: *Bradoria douvilleri* Mansuy. Aluta sp. Nothozoe.

Trilobites: *Redlichia chinensis* Walc., *R. nobilis* Walc., *R. Walcotti* Mansuy, *R. carinata* Mansuy, *R.* sp. *Palaeolenus douvilleri* n. sp. and gen., *P. lantenoisi* Mansuy, *P. deprati* Mansuy, *Ptychoparia yunnanensis* Mansuy. The new genus Palaeolinus is allied to Agraulos.

Matthew (G. F.) Traces of the Ordovician on the Atlantic coast.

Trans. Royal Soc. Canada, vol. 1, 1893, p. 253.

Holasaphus centropyge n. gen. et sp.

——— Organic remains of the Little River Group, No. IV.

Trans. Royal Soc. Canada, vol. 1, section iv, 1895, pp. 273-279, plate.

Amphipeltis paradoxus, Salter.

——— The Protolenus Fauna.

Trans. New York Acad. Sci., vol. 14, 1895, pp. 101-153, plates.

Ostracoda: *Hipponicharion eos* Matth., *H. cavatum* Matth., *H. minus* Matth. *Beyrichona papilio* Matth., *B. tinea* Matth., *B. planata* n. sp., *B. triangula* n. sp., *B. ovata* n. sp., *B. rotundata* n. sp. *Aparchites secunda* n. sp., *Primitia aurora* Matth., *P. oculata* n. sp., *P. ? fusiformis* n. sp. *Schmidtella cambrica* n. sp. *Leperditia ? ventricosa* Matth., *L. ? Steadi* Matth., *L. ? minor* n. sp., *L. ? primeava* n. sp.

Phyllopoda: *Leperditia sigillata*, Matth.

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MATTHEW (G. F.)—Continued

Trilobita: *Protagraulos priscus* n. sp. *Ellipsocephalus galeatus* Matth., *E. grandis* Matth., *E.* sp. *Avalonia acadica* n. sp *Micmacca Matthewi* n. gen. et sp., *M. Van Ingeni* n. sp., *M. recurva* n. sp., *M.? plana* n. sp. *Protolenus paradoxides* Matth., *P. bi-tuberculatus* n. sp. *Bergeronia n.* subgen., *B. elegans* W. D. Matthew, *B. articephala* Matth.

——— Fauna of the Paradoxides beds in Eastern North America.

Trans. New York Acad. Sci., vol. 15, 1896, pp. 191-247, plates.

Phyllopoda: *Leperditia alata* Matth., *L. curta* Matth., *L. auriculata* Matth.

Ostracoda: *Primitia acadica* Matth. *Aluta flexilis* n. gen. et sp.

Cirripedia: *Plumulites Manuelensis* n. sp. *Stenotheca concentrica Matth.* and var. *radiata, S. triangularis* Matth., *S. nasuta* Matth., *S. Hicksiana* Matth. *Cirripodites cambrensis* n. gen. et sp.

Trilobita: *Agnostus regulus* Matth., *A. rex* Barr. var. *transectus* n. var, *A. fallax* Linrs.; also var. *vir* n. var. *concinnus* n. var. and *trilobatus* n. var., *A. Acadicus* Hartt var. *declivis* n. var., *A. parvifrons* Linrs. var. *tessella* n. var. *truncatus* n. var., *A. umbo* Matth., *A. obtusilobus* Matth., *A. Davidis* Salt., *A. gibbus* Linrs. var. *partitus* n. var. *acutilobus* n. var., *A. Nathorsti* Br. *confluens* n. var., *A. fissus* Lund. *trifissus* n. var. *A. punctuosus* Ang., *A. laevigatus* Dalm., *A. terranovicus* n. var. *ciceroides* n. var., *A. mamilla* n. var., *A. nudus* Beyr. *Microdiscus Schucherti* Matth., *M. precursor* Matth., *M. Dawsoni* Hartt, *M. pulchellus* Hartt, *M. punctatus* Salter.

——— On *Microdiscus*.

Amer. Geologist, vol. 18, 1896, p. 30.

Microdiscus Schucherti n. sp.

——— Studies on Cambrian Faunas (No. 1).

Trans. Royal Soc. Canada, vol. 3, Sec. iv, 1897, pp. 165-203, 4 plates.

Agnostus Nathorsti Br., *A. fissus* Lund., *A. punctuosus* Ang., *A. parvifrons* Linrs. cf. var. *nepos* Br., *A. umbo* Matth., *A. laevigatus* Dalm. *Microdiscus pulchellus* Hartt? *Conocoryphe pustulosa* n. sp.

Matthews in his division of this genus, Studies on Cambrian Faunas No. 3, p. 89, uses for dwarf species with large glabella and apical spine to the front margin, suture within the rim, the term *Cainatops*, with this species as the type.

Paradoxides abenacus Matth. *Agraulos ceticephalus* Barr. var. *carinatus* n. var., *A. holocephalus* Matth., *A. Roberti* n. sp., *A.? nanus* n. sp., *A. pusillus* n. sp. *Liostracus validus* n. sp. *Ptychoparia limbata* n. sp., *P. Adamsi* Bill. *Solenopleura arenosa* Bill. var. *angilimbata* n. var., *S. Robbii* mut. *parva*. *Anomocare magnum* Br. *Dolichometopus Acadicus* n. sp. *Dorypyge Wasatchensis* H. & W., also var. *Acadicus* n. var., *D. quadriceps* H. & W. var. *valida* n. var., *D. horrida* n. sp.

——— Billing's Primordial Fossils of Vermont and Labrador.

Trans. Royal Soc. Canada, vol. 3, Sec. iv, 1897, pp. 194-200.

Bathyuriscus Meek, *B. senectus* Bill. *Dorypyge parvula* Bill. *Anomocare Tucer* Bill. *Ptychoparia Adamsi* Bill. *Solenopleura arenosa* Bill. *Conocephalites miser* Bill. *Dorypyge parvula* Bill. var. *angifrons* n. var.

——— What is the Olenellus fauna?

Am. Geol., vol. 18, 1897, p. 396.

Proposes the subgenus Callavia type *O. Bröggeri* Walc. and *O. callavii* Lapworth, because the glabella differs from *O. Kjerulfi*.

——— Some characteristic genera of the Cambrian.

Address Brit. Assoc., 1897, Geol. Mag. London, Decade iv, vol. 5, 1898, pp. 82-83.

The specie and genera have been described in other papers by this author.

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MATTHEW (G. F.)—Continued

——— Recent discoveries in the St. John Group, No. 2.

Bull. Nat. Hist. Soc., New Brunswick, No. xvi, 1898, pp. 32-34, plate.

Protolenus elegans n. sp., *P. paradoxoides* n. sp., *P. articephalus* n. sp., *Ellipocephalus galeatus* n. sp. *Olenus Zoppii* Menigh.

——— Studies on Cambrian faunas, No. 2.

Trans. Royal Soc. Canada, vol. 4, Sec. iv, 1898, pp. 123-150, 2 plates.

Ostracoda: *Primitia pyriforms* n. sp. *Aparchites ? robustus* n. sp. *Beyrichia ? primaeva* n. sp.

Trilobita: *Protagraulos priscus* Matth. *Micmacca Van Ingeni* Matth. *Agnostus pisiformis* with variations. *Anomocare stenotoides* Matth. *Olenus* (subgen. *Acantholenus)* n. subgen. *Acantholenus spinger* Matth.

——— A new Cambrian Trilobite.

Bull. Soc. N. B., vol. 4, 1899, pp. 137-142, plate.

Metadoxides magniferus n. sp.

——— Studies on Cambrian faunas, No. 3. Upper Cambrian fauna of Mount Stephen, B. C.

Trans. Royal Soc. Canada, vol. 5, Sec. iv, 1899, pp. 39-66, 7 plates.

Agnostus montis n. sp. *Ptychoparia cordillerae* Roem. *Conocephalites (Conaspis?)* cf. *perseus* Hall. *Corynexochus Roemingeri* Matth. *Dolichometopus occidentalis* n. sp. *Bathyuriscus Howelli* Walc., *B. pupa* n. sp. *Neolenus serratus* n. gen. et sp., *N. granulatus* n. sp. *Dorypyge Dawsoni* Walc. *Zacanthoides spinosus* Walc. *Ogygia (Ogygopsis) Klotzi* Roem. *Oryctocephalus Walkeri* n. sp.

——— Studies on Cambrian faunas, No. 4. Fragments of the Cambrian faunas of Newfoundland.

Trans. Royal Soc. Canada, vol. 5, Sec. iv, 1899, pp. 67-96.

Microdoscus bellimarginatus S. & F. *Agraulos (Strenuella) strenua* Bill. mut. *robusta* n. mut., *S. Attleborensis* S. & F. mut. *vigilans* n. mut. *Micmacca Walcotti* n. sp., *M. angimargo* n. sp. *Avalonia plana* n. sp., *Protolenus Howleyi* Walc. *Metadoxides magnificus* Matth. *Atops trilineatus* Emm. *Erinnys breviceps* Angelin.

——— The Etcheminian fauna of Smith Sound, Newfoundland.

Trans. Royal Soc. Canada, vol. 5, Sec. iv, 1899, pp. 97-119, plates.

Aptychopsis terranovicus Matth. mut. *arcuta.*

——— Preliminary notice of the Etcheminian fauna of Newfoundland.

Bull. Nat. Hist. New Brunswick, No. 18, vol. 4, 1899, Article 1, pp. 189-197, plate 1-3.

Aptychopsis terranovicus.

——— Preliminary notice of the Etcheminian fauna of Cape Breton.

Bull. Nat. Hist. New Brunswick, No. 18, vol. 4, 1899, Art. 2, pp. 198-208, plates 1-4.

Bradoria n. gen., *B. scrutator* n. sp., *B. vigilans* n. sp., *B. rugulosa* n. sp. *Schmidtella ? pervetus* n. sp., *S. acuta* nov.

The peculiarities of this fauna as distinguished from the Cambrian are the following: 1—Great preponderance of Hyolithidae. 2—Absence or rarity of Trilobites. 3—Minuteness of the Gasteropods, except Capulidae. 4—Minuteness of the Brachiopods. 5—Minuteness of the Crustaceans.

——— Cambrian rocks and fossils of Cape Breton.

Geol. Sur. Canada, n. ser., vol. 14, 1901, pp. 223-224.

Gives the leading genera of the several groups.

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MATTHEW (G. F.)—Continued

——— Additional notes on the Cambrian rocks of Cape Breton.

Bull. Nat. Hist. Soc. New Brunswick, No. 20, vol. 4, 1902.

Parabolinella quadrata n. sp. *Triarthrus belli* n. sp. *Angelina ?* sp. *Asaphellus Homfrayi* var. a, *A. ? planus.*

——— Ostracoda of the basil Cambrian rocks in Cape Breton.

Canadian Record of Science, vol. 8, No. 7, 1902, pp. 437-468, 2 p. with 2 plates.

Leperditia rugosa n. sp. *Bradorona n.* sub. gen., *B. perspicator* n. sp. mutation *maxima, magna, major, B. spectator* n. sp., also var. *acuta,* mutation *spinosa, aequata, B. observator* n. sp. and var. *benepuncta, laevis, ligata. Bradoria scrutator* Matth., *B. vigilans* Matth. mut. *obesa, B. rugulosa* Matth., *B. ? ornata* n. sp. *Escasona* n. gen., *E. rutellum* n. sp., *E. ? vetus* n. sp., *E. ? ingens* n. sp. *Indiana* n. gen., *I. ovalis* n. sp. mut. *prima, I. lippa* n. sp. *Schmidtella ? pervetus* Matth. mut. *concinna, S. acuta* Matth.

The author remarks that the *Bradoria* do not have the medium pit or sulcus of *Primitia,* the shallow median depression of *Primitella,* or the smooth valve of the *Aparchites.* Their most marked character is a prominence or tubercle just at the front of the hinge line.

——— Report on the Cambrian rocks of Cape Breton.

Geol. Survey of Canada, 1903, 246 pp., 18 plates.

Ostracoda of the basal Cambrian rocks in Cape Breton:

Leperdita ? rugosa Matth. *Bradorona perspicator* Matth. mutations *maxima, magna, Major B. spectator* Matth. mutations *acuta, spinosa, aequata B. observator* Matth. also var. *benepuncta* mutations *laevis, ligata. Bradoria scrutator* Matth., *B. vigilans* Matth. *obesa, B. ruglosa* Matth., *B. ? ornata* Matth. *Escasona rutellum* Matth., *E. ? vetus* Matth., *E. ? ingens* Matth. *Indiana ovalis* Matth. mutation *prima, I. lippa* Matth. *Schmidtella ? pervetus* Matth. mutation *concinna, S. ? acuta* Matth.

Trilobita: *Holasaphus centropyge* Matth. Paradoxidoid trilobite. *Solenopleura Bretonensis* n. sp. Eurypteroid crustacean?

Faunas of the St. John terrane.

Ostracoda: *Beyrichia triceps* n. sp.

Trilobita: *Agnostus trisectus* Salt. mut. *ponepunctus* Matth. mut. *germanus, A.* cf. *cyclopyge* Tullb., *A.* cf. var. *declivis* Matth. *Parabolina Dawsoni* Matth., *P. ? quadrata* Matth., *P.* cf. *limitis,* Br. *Spaerophthalmus Fletcheri* Matth., *S. alatus* Boeck. *Ctenopyge pecten* Salt. *Peltura scaraboeoides* Wahl. *Triarthrus Belli* Matth. *Angelina ? Asaphellus Homfrayi* Salt., *A. ? planus* Matth.

——— Remarkable forms of the Little River Group.

Trans. Roy. Soc. Canada, ser. 3, vol. 3, 1909, Sec. iv, pp. 115-125, plates 1-4.

Leaia silurica n. sp.

This species is allied to *L. Leidyi* of the Coal Measures of Pennsylvania, but has fewer concentric ridges.

Belinuropsis Wigudensis n. sp. et gen.

This crustacean is of the general type of Belinurus, but differs in its peculiar notched posterior border, the intergenal spine or flap, and the very narrow axis to the thorax, with seven instead of five segments as in Belinurus.

Maurer (F.) Nathrage zur Fauna und Stratigraphie der Orthoceerasschiefer der Rupbachthales.

Neues Jahrb. für Mineral Geol. Beil., vol. 10, pp. 613-756, plates.

Phacops fecundus Barr. *Cryphaeus acutifrons* Schluter. *Acidaspis pigra* Barr. *Bronteus* sp. and *Leperditia rhenana* n. sp.

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——— Der Quartzit von Neuweilnau.
Ber. d. Senckenb. Naturf. Ges. in Frankfurt, 1902, pp. 27-82, plates 3-5.
Gives figures of the head and tail of Homalonotus striatus nov. Head of H. ornatus Koch and tail of Homalonotus nulticostatus Koch.

McCoy (F.) Note on a new Australian Pterygotus.
Geol. Mag., Decade iv, vol. 6, 1899, pp. 193-194.
Pterygotus australis n. sp.
The species resembles *Pterygotus bilobus* Salter.

Meyer von (H.) *Jonotus reflexus* ein Trilobit aus der Grauwacke der Eifel.
Dunker and Meyer Palæontologica, vol. 1, p. 182, pl. 26, fig. 1a-b, 1848.
This new generic name given for *Harpes reflexus*, Hoeninghaus, 1847. Dr. Von Meyer copies Hoeninghaus' figures.

Michleborough (John). Locomotory appendages of Trilobites.
Geol. Mag., Decade 3, vol. 1, 1884, pp. 80-84, woodcuts on p. 162, figs. 1-3.
Asaphus megistos.

Miller (S. A.) and **Gurley** (W. F. E.) New species of Echinodermata and a new Crustacean from the Palæozoic Rocks.
Illinois State Museum Bull. No. 10, 1896.
The authors describe *Eurypterus kokomoensis* n. sp.
Clarke & Ruedemann Mem. N. Y. State Mus., No. 14, p. 212, place this under a new subgenus Onychopterus.

Moberg (J. C.) Anteckningar om Olands orthocerkalk.
Sver. Geol. Under. Ser. C, No. 109, 1890.
Asaphus platyurus maximus n. var.

——— Om en afdelning inon Olands dictyonemaskiffer säsom motsvarighet till ceratopygeskiffern i Norge.
Sver. Geol. Under. Ser. C, No. 109, 1890.
Shumardia pusilla Sars.

——— Om den af Trinucleus coscinorrhinus Karakteriserade kalken geologiska älder.
Sver. Geol. Unders., Ser. C, No. 125, Geol. Foren. Forh., 14-5, 1892.
Nileus armadillo var. *cornutus* n. var.

——— Till fragan om pygidiets byggnad hos *Ctenopyge pecten* Salter.
Geol. Fören. Förhandl, vol. 14, 1892, pp. 351-355, figures.

——— Silurisk Posidonomyaskiffer en egendomlig utbildning af Skänes oversilur med I tafla.
Sver. Geol. Unders., ser. C, No. 156, 1895.
Eoconchoecia n. gen., *E. mucronata* n. sp., *E.? imbecils* n. sp. *Cypridina Tosterupi* n. sp., *C.? obtusa* n. sp., *Colpos insignis* n. sp. et gen. *Primitia mundula* Jones var. *Beyrichia Steusloffi* Krausi, *B. Salterina* Jones.

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MOBERG (J. C.)—Continued

——— Supplement till Om Acerocarezonen.

Geol. Fören. i Stockholm Förh., Bd. 20, No. 5, 1898.

Acerocare claudican n. sp., figured.

——— En trilobit frän Skänes Dictyograptusskiffer.

Geol. Fören. Förh., Bd. 20, No. 6, 1898, plate XVII, pp. 317-324.

Hysterolenus Tornquisti n. sp. et gen.

——— En trilobit fran Skanes Dictyograptusskiffer Meddel, No. 5.

Fr. L. G. F. Geol. Fören., i Sthlm. Förh., Bd. 20, 1898.

Shumardia oelandica n. sp., p. 357, pl. 14, figs. 4-6.

Hysterolinus Tornquisti n. sp., p. 318, pl. 17, figs. 1-9.

———Sveriges älasta kända Trilobiter.

Geol. Fören. Förhandl., vol. 21, 1899, pp. 309-348, plates 13-15.

Georgiellus (Elliptocephala) asaphoides Emmons. *Olenellus Thompsoni* Hall. *Holmia Kjerulfi* Linrs. *Holmia Lundgreni* Moberg. *Mesonacis Vermontana* Hall. *Schmidtia Mickwitzi* Schmidt. *Schmidtia ? Torelli* Moberg. *Olenelloides armatus* Peach.

The original discovery of the Olenellus zone in Europe was made by Dr. A. G. Nathorst in 1868, Öfvers Kongl Vetens. Akad Förhandl, 1869, p. 64, in which he described a new and distinct horizon below the Paradoxides beds at Andrarum, Scania, containing trails and Lingula. The species now known as Olenellus Kjerulfi Linrs. was named Paradoxides Wahlenbergi by Torell in his Petrefacta Suecana Formationis Cambricae, 1869-70, p. 4, but he did not describe or figure the new species.

——— Nya bidrag till utredning af frägan om gränsen mellan undersilur och kambrium.

Geol. Fören. i Stockholm Förh., Bd. 22, 1900.

Dicellocephalina dicraeura Ang. *Shumardia oelandica* Mbg.

——— Bidrag till kännedomen om Trilobiternas byggnad.

Fören. Förhandl, vol. 24, 1902, pp. 295-302, plate 3.

Nileus armadillo Dalm.

From an example of *Nileus armadillo* Moberg shows the point of attachment of the muscles of the antennae, hypostoma epistome and several limbs of his species; eyes with 3,000 to 4,000 facets. He takes exception to Lindström, that the maculæ on the hypostome carry organs of vision and that of the earlier Olenidæ were blind.

——— *Schmalenseeia Amphionura* en ny Trilobit typ Meddelanden.

Lund. Geol. Mineral Inst., No. 5, Stockholm, 1903.

——— Om Robergia microphthalma Lnrs.

Geol. Fören. Förhandl., Bd. 28, Haft 2, p. 83, 1907.

——— Ett par bidrag till kännedomen om Skänes dicellograptus skiffer.

Geol. Fören. Förhandl., Bd. 29, Häft 2, Feb., 1907. p. 75.

Robergia microphthalma Linrs.

This new genus was founded on *Remopleurides microphthalmus* Linrs.

Geol. Fören. Förhandl., 1875, No. 26, Bd. 2, No. 12, p. 494, pl. 1, f. 3.

——— Om ett gätfultt fossil frän Sveriges olenidskiffer samt en kort ofversigt af viktigase data rorande trilobiternas ventrala skelettdelar.

Geol. Fören. i Stockholm Förh., Bd., 29, 1907, No. 5.

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MOBERG (J. C.)—Continued

——— *Aeglina umbonata* Angelin.

Lund's Geologiska Fältkubb., No. 12, 1907, Bd. 29, pp. 257-264, pl. 3.

The author refers *Corynexochus ? umbonatus* Ang. Palæont. Scand., p. 60, pl. 33, fig. 10, to this species; also *Æglina rediviva* Barrande. Syst. silur. Bohm, vol. 1, Suppl., p. 64, pl. 14, fig. 11.

——— Historical Stratigraphical Review of the Silurian of Sweden.

Sveriges Geol. Undersöknung, Sec. C, Nos. 229-202, pp. and map.

——— and **Gronwall** (K. A.) Om Fyledalens Gottlandium.

Lund Geologiska Fältkubb, Ser. B, No. 3, 1909, 84 pp., with 6 plates.

The authors describe and illustrate the following fossil Crustacea: *Leperditia inaequalis* Grönw. referring to it the following species: *L. Angelini* (Fr. Schmidt).

Lundgren Lund's Univ. Arsskr., Bd. 10, p. 9.

L. tyraica (Fr. Schmidt) Linnarsson, *L. phoseolus* (Hisinger).

Schmidt Misc. Silurica, No. 3, p. 9, as syn.

Aparchites obsoletus Jones and Holl. *Primitia mundula* Jones.

Beyrichia Buchiana Jones, *B. cuspidata* Gronw., *B. Kochi.* Boll; *B. Maccoyiana* Jones, referring *B. cincta* and *B. elegans* Boll, 1862, to this species.

Beyrichia nodulosa Boll, referring *B. spinulosa* and *nodulosa* Boll; also *B. dubia* Reuter, 1885, and *B. Lindstromi* cum var. *expansa* Kiesow, 1888, as syn. to the species.

Beyrichia obsoleta Gronw., 1897, *B. Salteriana* Jones, *B. scanensis* Kolmodin, referring *Beyrichia hians* Boll, 1856, to this species. *Beyrichia Steusloffi* Krause, 1891. *Kloedenia Kiesowi* Krause. This is the unnamed sp. of Angelin's, pl. A, figs. 16 and 17.

Beyrichia Wilckensiana Jones and var. *plicata* Jones. *Thlipsura tetragona* Krause, 1891. *Cytherellina siliqua* Jones. *Bythocypris triangularis* Gronw., 1897. *Phacops Downingiae* Murch. *Calymmene intermedia Lindstr.*, 1885. *Homalonotus Knighti* var. *rhinotropis* Ang. *Ceratiocaris* sp. and *Pterygotus* sp.

——— and **Moller** (H.) Om Acerocarezonen ett bidrag till Kännedomen om Skänes olenidskiffrar.

Geol. Fören. Förhandl., vol. 20, 1898, pp. 197-290, plates 10-14.

Acerocare ecorne Ang., *A. micropygum* Linrs., *A. granulatum* n. sp., *A. paradoxum* n. sp., *A. Tulbergi* n. sp., *A. claudicans* n. sp. *Parabolina acanthura* Ang., *P. heres* Br., *P. megalops* n. sp. *Acerocare norvegium* n. sp.

——— and **Segerberg** (Carl O.) Bidrag till Kännedomen om Ceratopygeregionen med särskild hänsyn till dess utveckling i Fogelsäng strakten.

Kongl. Fysiogr. Sällsk. Handl., Bd. 17, No. 7, 1906.

Crustacea: *Eremos bryograptorum* Wgd., mscr. n. gen. et n. sp. *Primitia ostrogothica* n. sp. *Beyrichia nana* Brogg., *B. nanella* Mbg. n. sp. *Ceratiocaris scanicus* n. sp. *Agnostus Sidenbladhi* var. *urceolatus* Sbg. mscr. n. var., *A. trinodus* Salt., *A. fossulatus* n. sp. *Shumardia oelandica* Mbg., *S. pusilla* Sars., *S. bottnica* Wiman, *S. Dicksoni* n. sp. *Parabolinella limitis* Brogg., *P. rugosa* Brogg. *Boeckia Mobergi* Wiman. *Acerocare norvegicum* Mbg. and Moller. *Triarthrus Angelini* Linrs. *Hysterolenus Tornquisti* Mbg., *H. ? laevicauda* n. sp. *Euloma ornatum* Ang. *Harpides rugosus* S. & B. *Ceratopyge forficula* Sars., *C. latelimbata* n. sp. *Dicellocephalus Broggeri* n. sp. *Apatocephalus serratus* S. & B., also var. *dubius* n. var. *Dicellocephalina dicraeura* Ang. *Symphysurus angustatus* S. & B., *S. incipiens* Brögg., *S. breviceps* Ang., *S. elongatus*

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MOBERG (J. C.) and SEGERBERG (Carl O.)—Continued

n. sp. *Nileus armadillo* Dalm., *N. limbatus* Brögg. *Niobe insignis* Linrs., *N. insignis* var. *angustifrons* Sbg. n. var., *N. obsoleta* Linrs., *N. laeviceps* Dalm. *Megalaspis intacta* n. sp., *M. stenorhachis* Ang., *M. planilimbata* Ang. *Illaenus oriens* n. sp. *Orometopus elatifrons* Ang., *Holometopus Tornquisti* n. sp. *Ampyx domatus* Ang., *A. obtusus* n. sp. *Cyrtometopus primigenus Ang., C. foveolatus* Ang., *Cyrtometopus speciosus* Dalm. *Harpina (Harpes) excavata* Linrs. *Crossoura parvula* n. gen. et n. sp., *C. lata* n. sp.

Monke (H.) Beiträge zur Geologie von Schantung I—Obercambrianbrische Trilobiten von Yentsy-yai.

Jahrb. d. Preuss. Landesanstalt und Bergakad. zu Berlin, 23, pt. 1, 1903, pp. 103-151, plates.

An abstract of this paper was published by Woodward in Geol. Mag., Dec. v, vol. 2, 1905, pp. 211 and 251, with a plate.

The author remarks: *Drepanura Ketteleri* Monke (like *D. Premesnili* Berg.) is founded upon detached pygidia, and separate and imperfect head shields; it also has elongated cheek-spines, which remind one of the very long lateral cheek and caudal spines of *Bathynotus holopyga* Hall, from the Lower Cambrian of Vermont.

Woodward refers *Stephanocare Richthofeni* Monke to Meek's genus *Olenoides*.

The following species and genera are described by Monke: *Agnostus Koerferi* n. sp. *Liostracina Krausei* n. gen. et n. sp. *Teinistion Lansi* n. gen. et sp., *T. Sodeni* nov. *Drepanura Premesnilli* Berg., *D. Ketteleri* n. sp. *Stephanocare Gichthofeni* n. gen. et sp. *Stephanocare Sinense* Berg.

The following species, described by Walcott, Proc. Natl. Mus., vol. 29, 1905, are synonyms: *Ptychopariaceus* Walc. syn. of *Liostracina Krausei* Monke. *Dorypygella typicalis* Walc. syn. of *Teinistion Lansi Monke. Damesella chione* Walc., syn. of *Stephanocare Richthofeni* Monke. *Teinistion Lansi* Monke is similar to *Shantungia spinifera* Walc., but differs in the presence of an incurved frontal margin and the absence of the long frontal spine.

Moysey (Lewis). On some Arthropod remains from Nottinghamshire and Derbyshire Coal Field.

Geol. Mag., Decade V, vol. 8, 1911, pp. 497-507, text figures.

The author illustrates *Leaia trigoniodes* sp. nov.; also the glabellar region Prestwichia and the terminal segments of air-breathing Arthropod. It shows a thick and possibly calcareous integument. *Anthracosiro fritschii* Pocock, and other crustacea.

Narraway (J. E.) List of Trilobites found at Ottawa and immediate vicinity.

Ottawa Naturalist, vol. 26, No. 8, pp. 98-100, November, 1912.

Nason (Frank S.) The Geological relations and age of the St. Joseph and Potosi Limestone of St. Francis County, Missouri.

Am. Jour. Sci., 4th ser., vol. 12, 1901, pp. 358-361.

Nifantof (A.) Beitrage zum Studium der Fauna des Devons der Berge von Mugodjary.

Tomsk. Izv. Technol. Inst., vol. 21, 1911, p. 26, pl. 3, figs. 29-33.

Dithyrocaris sp.

Norton (Wm. H.) Variations in the position of the nodes on the axial segments of pygidium of a species of Encrinurus.

Proc. Iowa Acad. Sci., vol. 3, 1896, pp. 79-81.

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The author remarks that in defining the different species of the genus Encrinurus, use has frequently been made of the disposition of the nodes on the joints of the axis of the pygidium. Foerste distinguishes *E. thresheri* from *E. ornatus* on this characteristic. The author gives the axial annulations of some 43 specimens from the Quarry at Mount Vernon; Iowa.

O'Connell (Marjorie). Summary of the distribution and occurrence of Eurypterids.

Geol. Soc. Am. Bull., vol. 24, pp. 498-515, 1913.

——— Description of some new Siluric Gastropods.

Bull. Buffalo Soc. Nat. Sci., vol. XI, 1914, pp. 93-101, plates 1-6.

Eurypterus Ruedemanni nov.

——— The habitat of the Eurypterida.

Bull. Buffalo Soc. of Nat. Hist., vol. XI, 1916.

The author gives a systematic review of the occurrence of the Eurypterida in each period from the Cambrian through the Permic.

Chapter 2. Résumé of the opinions on the habitat of the Eurypterida.

Chapter 3. The bionomy of the Eurypterid faunas.

Chapter 4. The Lithogenesis of the Eurypterid bearing beds.

Chapter 5. The geological and geographical distributions of the Eurypterids, with bibliography.

The conclusion reached by the author, after the study of all the available data, is that the Eurypterids throughout their entire phylogenetic history lived in the rivers. Schuchert in the earliest fresh water Arthropods, 1916, remarks that Eurypterids were marine animals previous to the Devonian, and that towards the close of the Silurian they became Eurhaline, or able to live in both salt and brackish water, and after Silurian time they probably became wholly restricted to the fresh water. Proc. Natl. Acad. Sci., vol. 2, 1916, p. 728.

Oehlert (D. P.) Sur les Trinucleus de l'ouest de la France.

Bull. Soc. Geol. France, 3rd ser., vol. 23, 1896, p. 299, plate.

Trinucleus Bureaui n. sp. The species is remarkable for the large tail. The author compares it with *T. ornatus*, the Bohemian form.

T. Grenieri Berg., *T. pongerardi* Roualt.

——— Fossiles Devonian Santa Lucia (Espagne). Primiere partie.

Bull. Soc. Geol. France, 3rd ser., vol. 23, 1896, p. 299, plates.

The author describes *Cryphaeus sublandiniatus* DeVern.

Cryphaeus (Malladaia) Luciae nov. sp. The author gives a figure in the text of this new subgenus, and compares it with Dalmanites and Phacops.

Cryphaeus Munieri Oehlert, and *Phacops Portieri* Bayle.

Cytherella cf. *subfusiformis* Sandberger.

——— *Uralichas Ribeoroi* des schistis d'Angers.

Mem. Soc. Geol. France, Palaeontologie, vol. 6, Fas., 1896.

——— Résumé des derniers travaux sur l'organisation et le developement des Trilobites.

Bull. Soc. Geol. France, ser. 3, vol. 24, 1896, p. 97.

Triarthrus Beckii Green.

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Ohern (D. W.) and **Maynard** (T. P.) Trilobites.

Maryland Geol. Sur. Lower Devonian, Baltimore, 1913, pp. 489-512, pl. 89-94.

The authors describe and illustrate the following species:

Proetus pachydermatus Weller, *P.* cf. *protuberans* Hall. *Cordania cyclurus* Hall and Clarke. *Cyphaspis Australis* n. sp. Ohern. *Calymmene camerata* Conrad. *Homalonotus Swartzi* n. sp. Ohern, *H. Vanuxemi* Hall. *Phacops Logani* Hall. *Dalmanites aspinosa* Weller, *D. Keyserensis* n. sp. Swartz, *D. multiannulatus* n. sp. Ohern, *D. latus* n. sp. Ohern, *Dalmanites (Synphoria) stemmatus* Clarke, *D. (Corycephalus) dentatus* Barrett, *D. micrurus* Green, *D. (Chasmops) anchiops* Green, *D. (Hausmannia) pleuroptyx* Green, *D. berkleyensis* n. sp. Swartz.

Olin (E.) Om de Chasmopskalken och Trinucleusskiffern motsvarande bildningarne i Skane.

Lund Geologiska Fältklubb, Ser. B, No. 1, 1906, 79 pp., with 4 plates.

Acidaspis Törnquisti n. sp. *Æglina rediviva* Barr. *Agnostus cingulatus* n. sp., *A. trinodus* Salt. *Ampyx globifrons* n. sp., *A. gratus* Barr., *A. Portlocki* Barr., *A. rostratus* Sars., *A. tenellus* Barr. *Areia suecica* n. sp. *Asaphus ingens* Barr. *Calymmene dilatata* Tulb., *C. incerta* Barr., *C. pulchra* Beyr., *C. trinucleina* Linrs. *Chirurus insignis* Beyr., *C. pectinifer* Barr., *C. subulatus* Linrs. *Cybele* cf. *Grewingki* F. Schmidt. *Dindymene cornuta* n. sp., *D. pulchra* n. sp., *D.* sp., *D. spinulosa* n. sp., *D. venusta* n. sp. *Dionide euglypta* Ang. *Holometopus* cf. *aciculatus* Ang. *Illaenus Angelini* Holm., *I. longifrons* n. sp., *I. megalopthalmus* Linrs. *Lichas laxatus* McCoy, *L. quadrispinus* Ang. *Phacops ecclesiatica* n. sp., *P. eucentra* Ang., *P. macroura* Sjogr., *P. recurva* Linrs., *P. sandbyensis* n. sp. *Phillipsia parabola* Barr. *Proetus scanicus* n. sp. *Pseudosphaerexochus laticeps* Linrs., *P. Ravini* n. sp. *Ptychopyge glabrata* Ang. *Remopleurides latus* n. sp., *R. radians* Barr., *R. sexlineatus* Ang. *Sphaerexochus* sp. *Staurocephalus clavifrons* Ang. *Stygina latifrons* Port. *Symphysurus superstes* n. sp. *Trinucleus Bucklandi* Barr., *T. ceriodes* Ang., *T. elliptifrons* n. sp., *T. latilimbus* Linrs.

Pack (Fred J.) Cambrian fossils from the Pioche Mountains, Nevada.

Jour. Geol., vol. 14, pp. 290-302, plates 1-3, 1906.

Bathyuriscus howelli Walcott, *B. productus* H. & W. *Ptychoparia piochensis* Walcott, *P. Kempi* n. sp. This species is an allied form of *P. subcoronata,* but has a peculiar boss in front of the glabella.

Zacanthoides typicalis Walc., *Z. grabaui* n. sp., differs from *Z. typicalis* in general shape of the head, the frontal margin and the genal spines.

Packard (A. S.) The Palæontological History of Trilobites, etc., as opposed by Barrande to the evolution theory.

Amer. Naturalist, vol. 8, 1874, p. 439.

——— On the systematic position of the Trilobites.

Proc. Amer. Assoc., 1893, p. 365.

Refers the Trilobites to a separate class, and regards them as being an older, more primitive group than the Crustacea. Hence, the Trilobites probably were the first to originate from the annelid worms, while the crustacea arose by a separate line of descent.

Partridge (E. M. Miss). Echinocaris Whidbornes (Jones & Woodward) and *Echinocaris sloliensis* n. sp.

Geol. Mag., Dec. 4, vol. 9, 1912, pp. 307-308, plate 17.

The last species much resembles *E. sociales* (Beecher) by the carapace and is much longer in proportion to its width.

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Parker (William A.) The fossil Arthropoda and Pices of Sparth, Rochdale.

Lancashire Naturalist Darwin, new ser., vol. 2, 1909, pp. 2-8.
Pygocephalus.

Parkinson (Harold). Ueber eine neue Culmfauna von Königsberg unweit Giessen and ihre Bedeutung fur die Gliederung des rheinischen Culm.

Inaugural Dissertation, Marburg, 1903, 46 pp., plates.
Trilobites: pp. 336-340, Zeitschr Deutsch Geol. Ges., 1902.
Griffithides seminifer Phillips. *Phillipsia Eichwaldi* Fischer nov. var. *hassiaca, P. gemmulifera* Phillips.

Perner (Jaroslav). Miscellanea Silurica Bohemiae.

Acad. Cisare Franktiska, Josefa, 1900.
The author describes *Cheirurus Hofmani* n. sp. pl. 1, figs 1-5.
Compares *Ch. pater* and *Ch. globosus.*

Perkins (G. H.) Geology of the Burlington Quadrangle.

7th Report Geology of Vermont, Bellows Falls, Vt., 1910, pp. 249-313, plates 53-62.
The author illustrates in the text *Triarthrus becki* Green, and in the plates without description the following species:
Harpes cassinensis Whitf. *Nileus stratus* Whitf. *Bathyurus perkinsi* Whitf. *Bolbocephalus seelyi* Whitf. *Bathyurus conicus* Whitf., *B. seelyi* Whitf. *Asaphus canalis* Conrad. *Isochilina cristata* Whitf., *I. gregaria* Whitf., *I. seelyi* Whitf.

Peach (B. N.) The Trilobites of the Silurian rocks of Southwest Scotland. Fauna, Flora and Geology of the Clyde area. Edited by C. F. Elliot, Malcolm, Laurie and J. Barclay Murdoch.

Brit. Assoc. Handbook, Glasgow, 1901, pp. 445-447.
List of Arthropoda of Scotland, pp. 450-455.

——— Scottish Palæontology during the last twenty years.

Proc. Phys. Soc. Edinb., vol. 14, 1902, pp. 361-394.
The author remarks under Schizopoda, that Pseudogathea agrees with Anthrapalaemon and must find a place with it. Both appear to me to be ancient forms of Lophogastrid schizopods. Huxley's Pygocephalus should be classed with the same group.

——— Monograph on the higher Crustacea of the Carboniferous rocks of Scotland.

Memoirs of the Geol. Sur. of Great Britain Palæontology, 1908, 822 pp. and 12 plates.
The author describes 34 species of fossil Schizopods.
The classification followed is chiefly based upon that adopted by G. O. Sars, arranged in two great groups, viz.:
1. The Mysid Group, including the families Lophogastridae, Perimecturidae, Anaspidae and Mysidae.
2. The Euphausiid Group has only one family, Euphausiidae.
Family Lophogastridae, Group No. 1.
Genus Tealliocaris gen. nov.
Body moderately long and slightly applanated; integuments firm and chitinous pitted or grained; carapace large, nearly one-half length of the body; seven trunk segments and externally more or less provided with longitudinal keels; rostrum spear-shaped,

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PEACH (B. N.)—Continued

three-edged and denticulated; hinder part of carapace not produced into backwardly directed spines; caudal segments wide, single-lobed epimera; eyes large with papilla issuing from the pedicle; antennular peduncle long, slender, the flagella being short and of nearly equal length. First pair of legs much more massive than the succeeding ones, which are slender; branchiae given off from the base of all the seven pairs of legs with lobate sternal branches; telson large.

The author includes under this genus:

Tealliocaris loudonensis sp. nov., *T. woodwardi*, Etheridge, Jr.; described under the genus Anthrapalaemon in 1877; also a variety *Tealliocaris etheridgei* Peach (originally described under the genus Anthrapalaemon in 1882) with the var. *lata* Peach, *T. robusta* sp. nov. and var., *T. tarrasiana* sp. nov., *T. formosa* Peach (originally described as an Anthrapalaemon in 1882).

Genus Pseudo-Galathea Peach, 1883:

P. macconochiei Etheridge, Jr. (described in 1879 as an Anthrapalaemon), *P. rotuda* Peach, *P. ornatissima* Peach (described in 1882 as *Anthrapalaemon ornatissimus.)*

Genus Anthrapalaemon Salter, 1861:

The author restricts this generic name to such applanted forms as the type *A. grossarti* Salter. *Anthrapalaemon russellianus* Salter (originally described under Palaeocarabus in 1863), also var. *spinulosus* and var. nov.

Family Perimecturus gen. nov.:

The characteristic feature of this genus is the enormous development of the tail.

The author includes under this genus: *P. parki* and var. *duplicicarinatus, P. stocki* sp. nov., *P. elegans* sp. nov., *P. communis* sp. nov., *P. ensifer* sp. nov., *P. pattoni* Peach *(Palaesquilla pattoni* Peach 1888).

Family Anaspidae:

Genus Palaeocaris Meek & Worthen, 1868.

Palaeocaris scotica Peach, *P. landsboroughti* sp. nov.

Family Mysidae:

Genus Palaemysis gen. nov.

Trunk unknown; tails long and fusiform, and segments supplied with well-developed epimera and well-developed pleopods. External branches of the uropods much longer than the forked telson; internal branches of uropods short so that the tail fan is deeply forked.

The author included in the genus:

Palaemysis dunlopi sp. nov., *P. couttsi* sp. nov. and *P. tenuis* sp. nov.

Family Euphausidae:

Genus Anthracophausia gen. nov.

Elongated laterally compressed, prawn-like forms, with thin, smooth chitinous integuments; carapace one-third the length of the body; peduncle on antenules long and massive, with last 2 joints extending beyond the rostrum; antenna, with basal scale and with flagellum longer than those of antennule; 7 pairs of legs, uniform; tail segments with deep epimera, all directed downwards and backwards; first 2 pairs of appendages of tail in the males very massive and specially modified for sexual purposes; telson as long as the uropods, and furnished near its ends with 2 articulated plates, one on each side.

The author describes *Anthracophausia dunsiana* sp. nov. with var. *obesa* and *A. traquairi* Peach.

Genus Crangopsis Salter, 1863; syn. the Palæocrangon and Uronectes Salter, 1861. *Crangopsis socialis* Salter, *C. rhodesi* sp. nov., *C. magna* sp. nov., *C. couttsi* sp. nov., *C. robusta* sp. nov., *C. eskdalensis* Peach (originally described under the genus Palæocrangon in 1882), *C. elegans* Peach (described in 1883 under the genus Palæocrangon), and *C. hastata* sp. nov., also *C. minuta* nov.

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Persson (Emil). Till kännedonen om Oleniderna i Zone n med Eurycare Och Leptoplastus vid Andrarum 1.

Meddel No. 11, fr. L. G. F. Geol. Fören. i Sthlm. Förhandl., Bd. 26, 1904.

Pocock (T.) The geology of the country around Macclesfield, Congle, Crewe and Middlewich.

Mem. Geol. Sur. Eng. London, 1906, p. 110.

Pompeckj (J. F.) Die Fauna des Cambrium von Tejrovic and Skrej in Bohmen.

Jahrb. d. k. k. Geol. Reich, 1895, Bd. 45, Heft 2 and 3, pp. 495-614, plates 13-17.

Agnostus section Laevigati: *Agnostus nudus* Beyr., *A. bibullatus* Barr.

Agnostus section Limbati: *Agnostus rex* Barr., *A. granulatus* Barr. *Agnostus integer* Barr., also var. *spinosa* n. var. *Paradoxides spinosus* Boeck, *P. rotundatus* Barr., *P. rugulosus* Corda, *P. imperialis* Barr., *P. orphanus* Barr., *P. expectans* Barr., *P. inflatus* Barr., *P. pusillus* Barr., *P. Jahni* n. sp. *Hydrocephalus carens* Barr., *H. saturboides* Barr. *Conocoryphe Sulzeri* Schloth., *C. (Ctenocephalus) coronata* Barr. *Ptychoparia striata* Emm., also var. *tenuis* n. var., *P. (Conocephalites) Emmrichi* Barr., *P. (Conocephalites) marginata* n. sp. *Solenopleura torifrons* n. sp., *S.? conifrons* n. sp. *Agraulos ceticephalus* Barr., *A. spinosus* Jahn. *Ellipsocephalus Hoffi* Schloth., *E. Germari* Barr., *E. vetustus* n. sp. *Protypus? bohemicus* n. sp. *Sao hirsuta* Barr.

——— Ein neuentdecktes Vorkomen von Tremadoc-Fossilien bie Hof. Munchen, 1896.

Bavarilla Hofensis Barr. *Dikelocephalus? bavaricus* Barr. *Niobe inotata* Barr., *N. discrepans* Barr.

——— Ueber Calymmene Brongniart.

Neuen Jahb. Mineral. Geol. Pal. Jahrg., 1898, vol. 1.

The Calymmenidae are divided as follows:

1. Subgenus Pharostoma Corda type, *P. pulchrum* Barr.
2. Subgenus Calymmene type, *C. tuberculata* Brunn.

First Family—*Calymmene senaria* Conrad.

Second Family—*Calymmene cambrensis* Salter.

1. Synhomalonotus type, *Calymmene Tristani* Brong.
2. Synhomalonotus type, *Calymmene Arago* Roul.
3. Subgenus Ptychometopus type, *P. Volborthi* Schmidt.

——— Versteinungen der Paradoxides Stufe von La Cabitza in Sardiniens und Bermerkungen zur Gliederung des Sardischen Cambrium.

Zeitschr. Deutsch Geol. Ges., 1901, pp. 1-23, plate.

Paradoxides mediterraneus n. sp. *Conocoryphe Héberti* Mun-Chalm et Berg. *Ptychoparia* sp. *Olenopsis Bornemanni* Menegh. *Olenellus (Hulmia) Broggeri* Walc. *Conocoryphe Levyi* Mun-Chalm et Berg.

The new name of *Paradoxides mediterraneus* is given to *P. rugulosus* Bergeron Massif. Ancien, p. 336, pl. 2, f. 5-7.

Price (W. Armstrong). Notes on the Palæontology of Boone County.

Geol. Sur. West Virginia, p. 614.

Griffithides scitulus Meek and Worthen.

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Prosser (Charles) and **Kindle** (Edward M.) Geol. Sur. Maryland Middle Devonian.

Baltimore, 1913, pp. 326-335, pls. 42-44.

The authors describe the following Fossil Crustacae:

Trilobita: *Cryphaspis Stephanophara* Hall. *Homalonotus DeKayi* Green. *Phacops rana* Gr., *P. cristata* Hall and var. *pipa* Hall.

Dalmanites (Cryphaeus) Boothi Gr.

The genus Cryphaspis was proposed by Dr. Green for certain Devonian Trilobites, in 1837, Am. Jour. Sci, vol. 32, 1837, p. 343, with figures of the genotype *Cryphaeus Boothi* and *C. calliteles.*

The term was pre-occupied for the Coleoptera in 1833.

Burmeister Org. Tril, 1843, under his sub-group Phacops, in which the pygidium has long spines on its circumference, classes *Asaphus archnoides* Goldf., a similar species, under Phacops. This species is now referred to *Cryphaeus punctatus* Steininger, 1831.

Milne Edwards Hist. Nat. Crust., vol. 3, 1840, pl. 34, fig. 8, copies Hoeninghaus's figure of *Calymmene archnoides,* 1833, and refers it to his new genus Pleuracanthus, at this time pre-occupied by Agassiz and Gray for fossil fish, 1832.

Corda Mong., Böhm Tril, 1847, p. 242, pl. 6, fig. 67, uses the term Metacanthus for *Phacops stellifer* Burmiester, and that of Asteropyge, on p. 241, with *Calymmene arachnoides* Goldf. as the genotype.

All the species described under Cryphaeus Green should take the generic name of Asteropyge Corda.

In the European species of this genus the terminal spine upon the pygidium generally exceeds in length all of the five marginal spines on each side.

Provost (Pierre). Notes sur les Entomostraces bivalves du terrain Houiller du Nord de la France.

Lill. Ann. Soc. Geol., vol. 40, 1911, pp. 60-80, plate.

Phyllopoda Estheria simoni n. sp. *Estheriella reumauxi* sp. nov.

Raymond (Percy E.) The Crown Point section.

Bull. Amer. Palæontology, vol. 3, No. 14, 1902, plates 18 and 19.

Gives list of Chazy fossils, including Trilobites and figures of *Thaleops ovatus* Conrad. *Bathyurus spiniger* Hall.

——— Notes on the names Amphion, Harpina and Platymetopus.

Amer. Jour. Sci., vol. 29, 1903, pp. 377-378.

Changes preoccupied name Amphion to Pliomera Ang. Harpina to Eoharpes n. gen. Platymetopus to Amphilichas n. gen.

——— The Trilobites of the Chazy Limestone.

Ann. Carnegie Mus., vol. 3, 1905, pp. 328-386, plates.

Harpina antiquatus Bill., *H. Ottawaensis* Bill. *Lonchodomas Halli* Bill. *Remopleurides canadensis* Bill. *Bathyurus Angelini* Bill. *Bathyurellus brevispinus* n. sp., *B. minor* n. sp. *Asaphus marginalis* Hall. *Asaphus* sp. *alpha beta* and *gamma. Isotellus Harrisi* n. sp., *I. obtusum* Hall, *I. angusticaudum* n. sp., *I. ? Beari* n. sp. *Illaenus indeterminatus* Walc., *I. punctatus* n. sp., *I. Bayfieldi* Bill., *I. globosus* Bill., *I. Erastusi* n. sp. *Thaleops ovata* Conrad. *Proetus Clelandi* n. sp. *Lichas (Platymetopus)* Ang. this subgenus changed to *Amplilichas* n. subgen. by the author in another publication *(Platymetopus minganensis* Bill.). *Acidaspis* (subgen. *Glaphurus* n. subgen.). *Glaphurus pustulatus* Walc., *G. primus* n. sp. *Cybele valcourensis* n. sp.

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RAYMOND (Percy E)—Continued

Amphion canadensis Bill. *Ceraurus pompilius* Bill., *C. hudsoni* n. sp. *Pseudosphaerexochus vulcanus* Bill., *P. vulcanus* var. *Billingsi* n. var., *P. approximus* n. sp., *P. Chazyensis* n. sp., *P. (Nieszkowskia) satyrus* Bill. *Sphaerocorphe Goodnovi* n. sp. *Sphaerexochus parvus* Bill. *Dalmanites (Pterygometopus) annulatus* n. sp.

Seven genera—Thaleops, Proetus, Glaphurus, Cybele, Sphaerocorphe, Sphaerexochus and Pterygometopus—make their first appearance in American faunas in the Chazy formation.

Three, Bathyurellus, Glaphurus and Amphion, are not found in formations above the Chazy.

Most of the genera found in the Trenton are represented in the Chazy.

——— The fauna of the Chazy Limestone.

Amer. Jour. Sci., vol. 20, 1905, pp. 353-382.

Leperditia limatula n. sp.

The new generic name of Heliomera is used for *Cheirurus sol* Billings, as the type.

——— Trilobites of the Chazy Formation in Vermont.

7th Report of the State Geologist, 1909-1910, Bellows Falls, Vt., 1910, pp. 213-248, plates 32-40.

This paper was published in Ann. Carnegie Mus., vol. 3, No. 2, 1905; but this article has all been reconstructed and important additions have been made.

The subgenus *Vogdesia*, on p. 225, has been given a generic name with *Isotelus bearsi* as the type.

Nileus vigilans Meek and Worthen, as figured in Palæont. Minnesota vol. 3, part 2, p. 712, figs. 17-19, the author compares with *Nileus Perkinsi*, which differs principally in respect to the eyes, which are much larger and further back on the cephalon in *N. Perkinsi*.

The species illustrated and described are:

Eoharpes antiquatus Bill., *E. ottawaensis* Bill. *Lonchodomas halli* Bill. *Remopleurides canadensis* Bill. *Bathyurus angelini* Bill. *Bathyurellus brevispinus* Raym., *B. minor* Raym. *Basilicus marginalis* Hall. *Vogdesia bearsi* Raym. *Onchometopus obtusus* Hall. *Isotelus harrisi* Raym., *I. platymarginatus* Raym. *Isotelus beta* Raym. *Bumastus limbatus* Raym. *Isoteloides augusticaudus* Raym. *Thaleops arctura* Hall. *Bumastus globosus* Bill., *B. erastusi* Raym. *Illaenus punctatus* Raym. *Proetus clelandi* Raym. *Amphilichas minganensis* Bill. *Glaphurus pustulatus* Walc. *Cybele prima* Raym. *Pliomerops canadensis* Bill. *Ceraurus pompilius* Bill., *C. hudsoni* Raym. *Pseudosphaerexochus vulcanus* Bill., *P. vulcanus billingsi* Raym., *P. approximus* Raym., *P. chazyensis* Raym. *Nieszkowskia satyrus* Bill. *Sphaerexochus parvus* Bill., *S. goodnovi* Raym. *Pterygometopus annulatus* Raym. *Isotelus harrisi* Raym., *I. platymarginatus* Raym. *Basilicus marginalis* Hall. *Ceratocephala narrawayi* Raym. *Heliomera sol.* Bill. *Nieszkowskia* or *Pseudosphaerexochus.*

——— On two new Trilobites from the Chazy near Ottawa.

The Ottawa Naturalist, vol. 24, Nov., 1910.

The author describes *Bathyurus superbus* n. sp., closely related to *Bathyurus extans* Hall, but larger.

Isotelus arenicola n. sp.

This species is more closely allied to *Isotelus gigas*, but this species has no genal spines like the new species.

——— Notes on Ordovician Trilobites, II. Asaphidae from the Beekmantown.

Ann. Carnegie Museum, vol. 7, No. 1, 1910, pp. 36-44, plate 14.

The author places a new genus under the family *Asaphidae (Isoteloides)*. In this

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RAYMOND (Percy E)—Continued

genus the glabella does not reach to the front of the cephalon, nor does it expand towards the front; it has also almost obsolete neck and dorsal furrows with a long and narrow form.

The author takes *Isoteloides Whitfieldi* for the type. This species is the *Asaphalus canalis* Whitfield, Bull. Am. Mus., vol. 1, p. 336, pl. 34, f. 1-8, not that of Conrad or Hall.

Hall credits the name to Conrad in MSS. and figures the hypostoma and doublure from Chazy Village, New York. This is probably what is now known as *Isotelus Harrisi* Raymond.

On account of the facial suture termination at a point in the middle of the anterior margin, the author classes as Isoteliform suture the genera Asaphellus, Asaphus and Isotelus.

In Niobe the suture cuts the anterior margin in front of the eyes, and follows around the frontal margin, as in Nileus; classed as the Niobiform suture.

The genera with forked hypostoma and with Isoteliform suture are arranged:

Asaphidae—Asaphus, Onchometopus Ptychopyge, Isoteloides and Isotelus. Basilicus is the only member with Niobiform suture. This form is common with the undivided hypostoma as in Ogygia, Ptychocheilus, Asaphelina, Niobe, Symphysurus, Illaenurus, Nileus Barrande, Homalopteon and Platypeltis.

A few genera with undivided hypostoma have Isoteliform suture, namely: Megalaspis, Megalaspides and Asaphellus.

The author describes *Asaphellus gyracanthus* n. sp. (*Asaphus canalis* Cleland), *A. monticola*. Subgenus to Niobe, Hemigyraspis n. gen. This genus is proposed with *Asaphus affinis* McCoy as a type. *H. collieana* n. sp.

The author includes *Ogygia desiderata* Barr. *Niobe menapiensis* Hicks, and *N. solvensis* Hicks. *Asaphellus planus* Matt. in the genus.

Megalaspis and *Megalaspides*.

Sub-family Asaphidae:

Asaphidae, hypostoma forked.

Section 1: Asaphidae with anterior limb of facial suture marginal Basilicus.

Section 2: Asaphidae with anterior limb of suture intra-marginal, Pythopyge, Pseudasaphus, Asaphus, Onchometopus, Isotelus, Isoteloides.

The author describes and figures *Asaphus marginalis* Hall, under the genus Basilicus, including as the young of this species *Asaphus alpha* and *A. gamma* Raymond.

The author remarks that the species is closely allied to *Basilicus tyrannus* Murch.

The pygidium figured shows two lobes somewhat similar to that of *Dicellocephalina dicraeura* Ang., as illustrated by Moberg, pp. 1-5, f. 14, Kongl. Fysiogr Söllsk. Handl., Ang., Bd. 17, No. 7, 1906.

Onchometopus obtusus Hall. *Isotelus harrisi* Raym., *I. platymarginatus* n. sp., *I. beta* Raym. *Isoteloides angusticaudus* Raym. *Nileus perkinsi* n. sp.

Subgenus Vogdesia.

The thorax is similar to that of Nileus, as is the pygidium. The cephalon, which is short and broad, is also similar to that of *Nileus*, but differs from it in having smaller and much more elevated eyes, and deeper dorsal furrows.

The author refers *Nileus vigilans* (M. & W.) as figured by Clarke, Palaeont. Minnesota, vol. 3, p. 713, and *Isotelus bearsi* Raym. to this genus. *Thaleops arctura* Hall, refers *Illaenus ovatus* Raym. to this species. *Bumastus globosus* Billings, *B. erastusi* Raym., *B. limbatus* n. sp. *Amphilichas minganensis* Billings. *Ceratophala narrowayi* n. sp. *Glaphurus pustulatus* Walc., *Cybele prima* Raym.

The author figures *Pliomera fischeri* Eich. *Pliomerops canadensis* Bill., *P. pseudoraticulatus* Portk., *P. barrandei* Bill., *P. senilis* Barr. The new genus Pliomerops, with

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RAYMOND (Percy E)—Continued

P. canadensis as its type, the author suggested, Am. Jour. Sci., vol. 19, 1905, p. 377, for the species of *Amphion (Pliomera)*, in which the cephalon has a denticulate frontal border, while the other species have smooth borders.

Subgenus Nieszkowskia sp. ind.

Subgenus *Heliomera sol* Billings.

Sphaerocoryphe goodnovi Raym.

Symphysurus Convexus Cleland, syn. *Illaenurus columbiana* Weller and *Bathysurus ? levis* Cleland.

The author gives illustrations of *S. sicardi* Berg. and *Illaenurus quadratus* Hall.

——— Notes on Ordovician Trilobites, III. Asaphidae from the Lowville and Black river.

Ann. Carnegie Mus., vol. 7, No. 1, 1910, pp. 46-59, plates 15-16.

In this paper the species *Bathyurus longispinus*, the hypostoma of *B. extans*, the free cheek of *B. spiniger*, and cephalon of *Isoteloides homalonotoides* are figured for the first time.

The author illustrates *Basilicus romingeri* Walc., placing as syn. *Asaphus Wisconsensis* Walc. and *Ptychopyge ulrichi* Clarke.

Under the genus Onchometopus, which may be readily distinguished from *Isotelus* by the presence of a median tubercle on the glabella; the absence of a concave border on both cephalon and pygidium, the author illustrates *O. simplex* n. sp.

Under the genus *Isoteloides* the author places *Asaphus homalonotoides* Walc.

The paper also includes notes on *Isotelus gigas* Dekay, *I. maximus* Locke.

——— Notes on Ordovician Trilobites, IV. New and old species from the Chazy.

Ann. Carnegie Mus., vol. 7, pp. 60-79, plates 17-19, 1910.

The material on which this paper is based is two collections, the first by the author, and the second by Dr. Perkins, State Geologist of Vermont, from Isle La Motte, which was published in advance of the State Report.

The author notes *Eoharpes antiquatus* Billings. *Remopleurides canadensis* Billings.

The author divides the family Asaphidae Emmerich into two sections. Ogyginae nov. Asaphidae with hypostoma entire and 8 segments in the thorax. Geologically the more ancient.

Section 1—Ogygina with anterior limb of facial suture marginal. Ogygia, Niobe, Asaphellus, Symphysurus, Nileus, Vogdesia, Illaenurus.

Section 2—Ogyginae with anterior limb of suture intra-marginal.

——— Notes on parallelism among the Asaphidae.

Trans. Royal Soc. of Canada, 3rd ser., vol. 5, sec. iv, 1912, pp. 111-120, plates 1-3.

The author remarks: On the ontogeny of the Asaphidae very little is known; also that from the observation of various authors, the following may be looked upon as primitive characters in this family:

1. Strongly segmented cephalon and pygidium.
2. Absence of depressed borders.
3. Long glabella.
4. Eyes distant from the glabella.
5. Facial suture marginal in front of the glabella.
6. Pygidium and cephalon short and broad.
7. Axial lobe narrow.
8. Genal spines present.

Judged merely by these characteristics Ogygopsis, Ogygiocaris, Ogygites, Asaphus,

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RAYMOND (Percy E)—Continued

Niobe, Symphysurus and Basilicus, are more primitive than Isotelus, Nileus, Ptychopyge, Hemigyraspis and Asaphellus.

The author quotes Brögger's studies on the hypostoma and his division of three distinct types.

Pointed behind, Megalaspis and Ogygiocaris.

Quadrate, *Niobe insignis.*

Extended behind into two long, large prongs, Asaphus, Isotelus, etc. He remarks under the Geologic range, that the Asaphids appear earlier in America and have a longer range than in any other country.

The Cambrian, which have entire hypostomas, consists of the genera Ogygopsis, Illaenurus, Symphysurus, Asaphellus, Hemigyraspis and Megalaspis.

Ordovican, Beekmantown, the Asaphids are less varied as only Isoteloides and Nileus are present.

In the Chazy, Isotelus, Isoteloides, Basilicus, Onchometopsus, Vogdesia and Nileus occur.

In the Silurian, in the Lowville (Silurian) and Back River (Ordovian), the genera Onchometopus, Isotelus, Isoteloides, Basilicus and Vogdesia.

In the Trenton there are, so far as is now known, only Isotelus and Isoteloides.

In the Utica, Isotelus and Ogygites.

In the Richmond, Isotelus, Onchometopus, Brachyaspis and probably Ogygites.

The author uses *Asaphus expansus* as the type of the genus, which is characterized by its short, broad head, and pygidium from which all depressed borders are absent; by the rather prominent glabella, which expands towards the front and reaches the anterior margin; the large eyes; the course of the anterior portion of the frontal suture, which meets in a point in front of the eye; and the short pygidium, with narrow, well-defined axial lobe and smooth pleural lobes.

The genus is well developed in the Baltic Region.

Under the heading of lines of development from the Asaphus, the author remarks that the variation in the Ordovician Baltic species seems to be in the direction of the obliteration of furrows on the surface; that is a further loss of evidence of original segmentation in cephalon and pygidium.

Onchometopus differs from Asaphus, in having the glabella less marked, the axial lobe of the thorax wider, the thoracic segments flatter, the axial lobe of the pygidium less convex and without rings.

Megalaspides, like Asaphus, with narrow axial lobe, expanding glabella, no depressed border on the pygidium, but with a narrow one on the front of the cephalon.

Isoteloides, in which both the cephalon and pygidium have depressed borders.

Isotelus, in which the axial lobe of the thorax is wide, the glabella and the axial lobe of the pygidium so ill-defined as to merge into the general surface of the head; therefore, both these smooth trilobites and species of Brachyaspis and Onchometopus are so like Isotelus, that the three genera can only be separated by their lines of development.

Basilicus is a primitive genus, with forked hypostoma, with a strongly ribbed tail; the facial suture marginal in front, and the glabella strongly outlined and shows glabella furrows.

The author remarks from Basilicus, Ogygites seems to have developed.

Tromelin and Lebesconte, Assoc. Francaise, Adv. Sci., 1875, p. 33, use the new generic name of Ogygites for Brongniart's Ogygia, it having been used for other genera in natural history. These authors use O. Desmaresti Brog. for the type, and include O. Brongniarti Rou. as a syn. The same authors refer Ogygia, the first species described under the genus by Brongniart, to the genus Asaphus.

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RAYMOND (Percy E)—Continued

The author considers Pseudoasphus Schmidt as the next step in the development from Basilicus and Ogygites.

The author is in error in his remarks that Brongniart applied the name of Ogygia to *O. buchii* and *O. dilatata* with forked hypostoma. Brongniart applied the name to an Asaphus. The second species described by Brongniart, according to Tromelin and Lebesconte, *ibid*, p. 34, has the entire hypostoma characteristic of *O. desiderata* Barr. Syst. Sil de Bohéme, vol. 1, Suppl., pl. 4, fig. 3.

The author illustrates *Brachyaspis notans* Billings. *Ogygites canadensis* Chapman. Remarks: this species has a forked hypostoma, and should not be included under the genus.

Plate 2—*Onchometopus susae* Whitfield. *Brachyaspis alacer* Bill., *B. altilis* Raym. n. sp. *Megalaspis goniurus* Bill. *Isotelus gigas* DeKay. *Nileus perkinsi* Raym.

Plate 3—*Nileus perkinsi* Raym. *Onchometopus obtusus* Hall. *Bumastus globosus* Bill. *Nileus affinis* Bill. *Symphysurus illaeonoides* Bill. *Isotelus gigas* DeKay, and *Hemigyraspis* sp.

——— Some changes in the names of genera of Trilobites.

The Ottawa Naturalist, vol. 26, Feb., 1913.

The author remarks on the ten new genera described by Jaekel in Zeit. d. Deutsch Geol. Ges., vol. 61, pp. 380-401, 1909, should be rejected and referred to older names as follows:

Paragnostus to Condylopyge Corda, Dichagnostus to Pleuroctenium Corda, Mesagnostus to Peronopsis Corda, Miagnostus to Lejopyge Corda, Leiagnostus to Phalacroma Corda, Metagnostus to Arthrorhachis Corda. These six new genera the author rejects.

The author would reject Microdiscus Emmons, because it was founded on a young specimen of the genus Trinucleus, and substitutes Eodiscus. This would overlook Salter's Microdiscus—the generic name should read Microdiscus Salter (not Emmons).

Raymond, who examined the type specimen of *Pemphigaspis bullata* Hall, does not place it with Microdiscus, as suggested by Walcott.

The author is in favor of using Green's generic name Cryptolithus for Murchison's genus Trinucleus. This generic name has long been used by Bronn, Goldfuss, Emmrich, Angelin, Foerste and Vogdes. Eaton's genus Nuttainia of 1832 not used. Dr. Jacob Green claimed priority in his Monograph of Trilobites. The generic name was first described in Am. Jour. Geol., June, 1832.

The author uses Ogygites, Tromelin and Lebesconte, for primitive Asaphinae, with annulated pygidia and forked hypostomata, and Ogygiocaris Angelin, for *Ogygia Buchi* and *O. dilatata*.

The author favors the adoption of Goldius for Brontes and Bronteus. For Acaste Goldfuss, the author takes the generic name Phacopidella. Reed, 1906, as Leach in 1811, used the first genus for a genus of Cirripedes. Arges was used by Haan in 1835, and the author uses Ceratarges Gurich, for the generic name; also Aulacopleura Corda, in place of preoccupied generic name Arethusina Barrande.

——— Notes on Cyclosytoides.

Notes on some new and old Trilobites in the Victoria Memorial Museum. Description of some new Asaphidae. Two new species of Tetradium. Revision of the species which have been referred to the genus Bathyurus (preliminary paper).

Bull. No. 1, Victoria Memorial Museum, October 23, 1913, 80 pp., with 7 plates.

The author remarks on *Harpes dentoni*, which he refers to the new genus Eoharpes from a more, or rather poorly preserved specimen, that it has from 18 to 16 segments

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RAYMOND (Percy E)—Continued

in the thorax, as it is not possible to tell where the pygidium begins. He compares the species with *E. ottawaensis*. In front of the glabella the brim of *E. dentoni* is narrow, deeply concave, and the anterior rim is curved upward; while in *E. ottawaensis* the brim, at the front, is wide and nearly flat.

The author also describes and illustrates *Bumastus billingis* R. & N. *Holasaphus moorei* Matthew. *Pseudosphaerexochus apollo Billings*, to which he refers the *Amphion cayleyi* Billings and *Ceratocephala goniata* Warder.

VI. Description of some new Asaphidae.

The author includes under the genus Hemigyraspis, a specimen figured in Trans. Roy. Soc. Canada, vol. V, pl. 3, fig. 7, for a form similar to *Asaphellus planus* Matthew, which the author now refers to *Hemigyraspis mcconnelli* sp. nov. Including under the genus this species, also *Asaphellus planus* Matthew and *Hemigyraspis collieana* Raymond, 1910.

The author used as a type for his subgenus Hemigyraspis, *Asaphus affinis* McCoy, as described by Salter, Mong. Brit. Tril., pl. 24, figs. 13-14, p. 164, and included *Ogygia desiderata* Barr. *Niobe menapieensis* Hicks and *N. solvensis Hicks* with the above species.

Under *Basilicus Barrandi* Hall, the author remarks that this species has evaded the eyes of the describers of Trilobites, and it was not until recently that the writer's curiosity to know what form it was which Vogdes referred to Ogygia (Catalogue of Trilobites, p. 324) caused him to unearth it.

Raymond places as syn. to Hall's species *Asaphus wisconsensis* and *romingeri* Walcott, 1879. *Ptychopyge ulrichi* Clarke, and *Basilicus romingeri* R. & N.

Under the Genus Ogygites Tromelin and Lebesconte, 1875.

The author describes and illustrates *Ogygites canadensis* Chapman, referring as syn. *Asaphus halli* and *hinksii*, and comparing *Asaphus latimarginatus* Hall, with the species.

The author describes as new *Isotelus latus*, differing from *I. gigas* in having all its parts much wider.

Raymond remarks, that the Museum contains a number of specimens of Isotelus from St. Joseph Island, from which Stokes in 1823 figured a specimen as *Asaphus platycephalus*, which compares well with DeKay's *I. gigas* of 1824, and advocates the dropping of DeKay's species.

The following authors use *platycephalus* Stokes, in preference to DeKay's name of *I. gigas*: Bronn in 1835, Buckland in 1840, Burmeister in 1843, Roemer in 1851-56, Nieszkowski in 1857, Billings in 1863, and Vogdes in 1893. I think due credit should be given to Stokes and eliminate *gigas*.

The author also describes and illustrates *Isotelus maximus* Locke, and *Brachyaspis altilis* Raymond, the *Asaphus platycephalus* Billings. (Catalogue of Silurian Fossils of Anticosti, p. 26, fig. 9b.)

VIII. A revision of the species which have been referred to the genus Bathyurus.

The author states that Billings erected the genus Bathyurus with *Asaphus extans* Hall, for the type, and described many species under it. Some 50 species have been referred to this genus; but in the revision the author only includes twelve, including three new species.

Under the Family Bathyuridae Walcott, the author gives a revised generic description and describes the following species:

Bathyurus extans Hall, *B. perplexus* Billing, probably a synonym of *B. extans*, *Bathyurus johnstoni* sp. nov. closely allied to *B. extans*. Bathyurus sp. intermediate between *B. extans* and *B. superbus*. *Bathyurus superbus* Raymond. This species attains a larger size than any other known Bathyurus. *B. longispinus* Walcott, *B. amplimar-*

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RAYMOND (Percy E)—Continued

ginatus Billings (syn. *B. minganensis* Bill.), *B. glandicephalus* Whitf., *B. angelini* Billings, *B. acutus* sp. nov., *B. arcuatus* Bill., *B. spiniger* Hall, *B. ingalli* sp. nov. and *B. schucherti* Clarke.

With *Bathyurus mero* Bill., for a type the author proposes the new genus Petigurus.

The genus is closely allied to Bathyurus, but differs as follows:

The facial suture reaches the posterior margin near the genal angle, the anterior end of the glabella overhangs the concave border; glabellar furrows are entirely absent, and the eyes are somewhat farther forward. The pygidium is without concave border, the ribs of the pleural lobes are reduced to nodes, and the axial lobe is ringed for almost its entire length.

Petigurus Nero (Billings) an Irish species described by Reed, 1910, as *Bathyurus* aff. *nero*, differs in the posterior end of the facial suture, turns sharply outward behind the eye, forming a broad, fixed cheek, different from *Petigurus nero*, and from any species of Bathyurus.

The author also refers to the genus *Petigurus cybele* (Billings).

Family Solenopleuridae Angelin:

The author gives the following diagnosis of his new genus Hystricurus: Type *Bathyrus conicus* Billings.

Glabella conical, tapering towards the front, outlined by deep furrows at sides and front; glabella furrows absent; fixed cheeks long, extending nearly to the genal angle; dorsal furrows paralleled by a narrow, convex ridge; eyes of medium size, situated opposite the middle of the glabella; cranidium with deeply concave border in front; pygidium rounded, with concave border, axial lobe prominent, with 5 rings, and there are 5 pair of ribs on the pleural lobe; surface smooth or pustulose.

In addition to the type which the author illustrates, he includes under the genus *Hystricurus crotalifrons* (Dwight, 1884) and *H. cordai* (Billings), *B. seelyi* Whitf. Bull. Am. Mus., vol. 2, p. 62, pl. 13, figs. 8-14, as a synonym, and not *B. seelyi*, vol. 1, 1886, referred to *Bolbocephalus*.

Family Proetidae Barrande:

Genus Haploconus nov. This genus is proposed to include Trilobites related to Cyphaspis, but differing in not having isolated basal lobes on the glabella, and in having a less prominent axial lobe on the pygidium. Type *Bathyrurus smithi* Billings.

The author describes *H. smithi*, and includes in the genus *Cyphaspis ? galenensis* Clarke, and probably *C. ? brevimarginata* Walcott.

Family Dikelocephalidae, Miller, 1889:

Miller includes in the family Dicellocephalus, Pterocephala and Ptychaspis.

The author proposes the new genus Platycolpus, for *Bathyurus capax* Billings, a Trilobite with hemispheric, rather smooth cephalon, a depressed glabella extending to the anterior border, which is a flat, striated rim; glabella furrows faint or absent; eyes small, situated midway on the length of the head; facial sutures cutting the posterior margin just inside the genal angles, and the anterior margin in front of the eye.

Pygidium semi-circular, without depressed border and with faint traces of segmentation.

The author describes *Platycolpus capax* (Billings), *P. eatoni* Whitf., which has faint glabella furrows, also *P. dubius* with a more pointed glabella, and *P. barabuensis* Whitf. with a more convex glabella.

Family Agraulidae Dalman:

Under the new genus Plethopeltis with *Agraulos saratogensis* Walcott, for the type the author gives the following diagnosis:

Cephalon strongly convex, wider than long, without concave border or marginal rim; glabella faintly defined, without glabella furrows; eyes small, situated well for-

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RAYMOND (Percy E)—Continued

ward; free cheeks, rather wide, smooth, with short spines at the genal angles; pygidium small, with few traces of segmentation; convex; no border.

The author also includes *Plethopeltis armatus* (Billings) described under Bathyurus by Billings in 1860.

Family uncertain.

Goniurus nov. Type *Bathyurus perspicator* Billings, 1865.

Type diagnosis for this genus includes Trilobites, in which the facial suture, as in Bathyurus, except that the fixed cheek extends a little farther towards the genal angle; eyes very long, narrow and close to the glabella; glabella long, reaching almost to the frontal margin, tapering rapidly in front of the eyes; neck furrow sharp, extending across fixed and free cheeks; genal angles with short, sharp spines; a narrow, elevated rim extends around the whole cephalon, and the cephalon is slightly nasute in front; pygidium convex, triangular, with a long terminal spine.

Goniurus perspicator (Billings), *G. caudatus* (Billings), *G. elongatus* n. sp.

Matthew, Trans. Roy. Soc. Canada, vol., 1895, p. 269, referred to *Bathyurus candatus* Billings, as a possible species of this genus Holasaphus; but the pygidium has no furrow within the border.

Genus Lloydia Vogdes, 1890.

This genus was proposed by Vogdes in Ball. U. S. Geol. Sur., No. 63, p. 97, for *Bathyurus bituberculatus* Billings, in honor of the first author on Trilobites.

Edward Lloyd published in Philosophical Trans., vol. 20, No. 243, p. 279, 1698, the first description of Trilobites.

Dr. Billings, in the Canadian Naturalist and Geologist, vol. 5, 1860, p. 317, provisionally refers to his genus Bathyurus, two species of fossils from Point Levi as *Bathyurus dubius* and *B. bituberculatus* figs. 21 and 22. The second species, which is represented by a rough woodcut, presents a glabella, somewhat tumid and extending to the front margin, with basal lobes elongated, oval and pointed at both ends, separated from the glabella by shallow, obscure grooves; eyes opposite the mid-length of the glabella.

Raymond places the first species of Bathyurus in the family Dikelocephalidae, under a new genus *Platycolpus bubius*, and gives the following diagnosis of Lloydia Vogdes.

Whole animal oblong in outline; cephalon and pygidium regularly rounded, with elevated convex borders; cephalon convex; glabella usually tapering towards the front and reaching to the marginal border; glabella outlined by shallow or deep dorsal furrows; eyes small, near the dorsal furrows, and situated halfway to the front; facial sutures cut the posterior margin at the genal angles and the anterior margin in front of the eyes; genal angles usually without spines; thorax of 9 segments, pleura deeply grooved, ending in long, acute spines; pygidium with narrow axial lobe, which may have from 1 to 8 joints; pleural lobes smooth. The convex border which encircles the pygidium is set off by a shallow furrow.

Type *Bathyurus bituberculatus* Billings, which is common in the conglomerates at Point Levis near St. Joseph's Church, Beekmantown age.

The author also includes under Lloydia, Bathyurus Saffordi, which differs from the type, in lacking the basal lobes on the glabella; also *Bathyurus solitarius*, from Hare Bay, Newfoundland. *Lloydia oblongus* (Billings), similar to *L. saffordi*, but has straight sides to the glabella instead of tapering forward.

The author includes with doubt *Lloydia strenuus* Billings.

The illustration given by Billings, Pal. Fossils of Canada, p. 204, fig. 188, compares well with the type of Bathyurus.

Dr. Raymond places two species described by Billings as *Bathyurus quadratus* and *breviceps*, under a new genus Leiostegium, with the following diagnosis: General

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RAYMOND (Percy E)—Continued

form elongate, oval; cephalon and pygidium, nearly equal, both rounded, smooth and convex; glabella quadrate, outlined by deep, narrow dorsal furrows and extending to the very narrow elevated anterior rim; fixed cheeks wide, eyes small and far from the glabella; thorax of 9 segments; pygidium almost semi-circular, unsegmented; axial lobe elevated, extending nearly the whole length. No concave border. Type *Bathyurus quadratus* Billings.

——— Notes on the ontogeny of *Isotelus gigas* DeKay.

Bull. Mus. Comp. Zoology Harvard College, vol. 58, No. 5, 1914, p. 247-263, with 3 plates.

The author gives the ontogeny of three Asaphids, namely, *Isotelus gigas, I. maximus* and *Basilicus barrandei.* Raymond remarks on:

I. Basilicus stage. The glabella is convex, narrowed behind, with a median tubercle and basal lobes. The brim is wide and horizontal; the cephalon semi-circular in outline; the genal angles produced into long spines; the axial lobe of the thorax is narrow; the pygidium has a prominent axial lobe, and the pleural lobes of the pygidium are ribbed.

II. Ogygites stage. The glabella soon becomes flattened and the facial sutures intermarginal, as in the adult of Ogygites.

III. Isotelus stage. The head and tail both become smooth and the axial lobe widens, as in the adult of Isotelus.

IV. *Isotelus gigas* stage. The head and tail becomes triangular and the spines are lost from the genal angles, a combination of characters distinguishing this species.

The author remarks in regard to *Isotelus Iowensis* Owen, that it is so closely allied to *I. gigas,* that where the two species occur together, as at Trenton Falls, it seems almost like hair-splitting to recognize two species. The adult *Isotelus iowensis,* has long genal spines extending to the 5th, 6th and 7th segments of the thorax.

Isotelus maximus Locke.

The author remarks that the common asaphids at Cincinnati are *Isotelus gigas, I. maximus, I. latus,* an undescribed species and one of the genus Onchometopus.

The four more common species of Isotelus in the Middle and Upper Ordovician are classed as follows:

A. Shield about three-fourths as long as wide.
  a. Adult without genal spines, shield subtriangular, *I. gigas.*
  b. Adult with genal spines, shield rounded, *I. iowensis.*

B. Shields less than three-fourths as long as wide, regularly rounded.
  a. Adult without genal spines, *I. latus.*
  b. Adult with genal spines, *I. maximus.*

The author places *Proetus spurlocki* Meek as a young Isotelus, probably that of *I. maximus.*

The article closes with a description of *Basilicus Barrandei* Hall, the author referring *Asaphus romingeri* Walc. and *A. wisconsensis* Walc. to the species, including *Ptychopyge ulrichi* Clarke, under the same.

——— Notes on the ontogeny of Paradoxides, with description of a new species.

Bull. Mus. Comp. Zoology Harvard College, vol. 58, No. 4, 1914, pp. 225-244, plates.

The author describes and illustrates *Paradoxides Harlani* Green, and a new species, under the name of *Paradoxides Haywardi,* with a Bibliography of the genus.

The author classes the genus after Ford into two groups:

A. With the second segment of the thorax prolonged beyond the others. To this group belong the Bohemian and South European species.

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RAYMOND (Percy E)—Continued

B. A group of species, in which the second segment of the thorax is in no way distinguishable from the others. To this group belong the Scandinavian, British and American forms.

The author remarks that *Paradoxides Harlani*, differs from other species and one which makes it almost unique, in the wide, depressed brim at the anterior end of the cranidium.

——— New and old Silurian Trilobites from S. E. Wisconsin, with notes on the genera of Illaenidae.

Bull Mus. Comp. Zool., vol. 60, 1916, No. 1.

The author divides the Illaenoidae into two sections:

I. Illaenoidae.

Genera Illaenus, Thaleops, Dysplanus, Wossekia gen. nov. and Octillaenus, Bumastinae, Genera Bumastus, Actinolobus, Illaenoides.

Under Bumatus the author includes descriptions of the following species:

Bumastus cuniculus Hall, *B. Niagarensis* Whitf., *B. Dayi* nov., *B. decipiens* nov., *B. tenuis* nov., *B. insignis* Hall, *B. ioxus, B. graftonensis.*

M. & W. & B. *indeterminatus* Walc.

Under Eichwald's genus Actinolobus, he refers a single pygidium as *Actinolobus Americanus* from Racine Dolomite.

II. Lichadidae—The author refers Weller's *Dicranopeltis nasuta* to *Trochurus nasuta.*

Odontopleuridae—Ceratocephala goniata Warder, 1838.

Encrinuridae—Encrinurus reflexus nov.

The author refers to a new species a pygidium of large size, with 8 pairs of ribs on the lateral lobes, which he compares with other American species.

Calymmenidae—The author enumerates the following species:

Calymmene Niagarensis Hall. *C. breviceps* nov. for Hall's *C. Niagarensis,* 28th Rep. N. Y. State Cab. Nat. Hist., pl. 32, fig. 7-15.

Calymmene celebra nov. for Hall's *C. Niagarensis,* 20th Rep. N. Y. State Cab. Nat. Hist., p. 334, based on the pygidium which has 4 pairs of narrow ribs without impassed line, that reach only one-half way to the margin. New genus Liocalymene, with Vauxem's species *Hemicrypturus Clintoni* for its genotype. This form has a smooth pygidium without ribs and a jointed axis, from the Clinton of New York.

This genus should include the French and Spanish Silurian form described as *Calymmene Aragoi* by Rouault, which differs from *C. Salteri* described by the same author in having 10-11 joints on the axis, and *C. Arago* only 7.

Cheirurus Niagarenis Hall. The author restricts this species to Hall's species from Rochester, Pal. N. Y., vol. 2, p. 303, pl. 67, figs. 9-10.

Raymond refers the *Ceraurus insignis* Hall, Pal. N. Y., vol. 2, 1852, p. 300, pl. 6a, fig. 4, to *Cheirurus Welleri* nov. Also included Roemer's *C. bimucronata* Sil. Fauna, Tenn., p. 80, pl. 5, fig. 19, and Hall's *C. Niagarensis.* 20 Rep. N. Y. State Cab. Nat. Hist., pl. 21, figs. 10-11, and others.

Cheirurus dilatatus nov. for Hall's *Sphaerexochus Romingeri?* 28 Rep. N. Y. State Mus. Nat. Hist., 1877, pl. 32, fig. 16.

Cheirurus patens nov., *C. Tarquinius* Bill., *C. Hydei* Weller, and *C. nuperus* Bill. The type of this species was lost and no further specimens have been described.

Sphaerexochus Romingeri Hall. The author remarks that the pygidium of this species is rare and usually incorrectly figured. The pygidium is entire, and the spine-figured by Hall are the ribs on the pleural lobes.

——— Beecher's classification of Trilobites after twenty years.

Am. Jour. Sci., ser. 4, vol. 43, 1917, p. 196-210.

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RAYMOND (Percy E)—Continued

The author remarks on the order Hypoparia in Beecher's classification. Since the young of practically all primitive Trilobites lack eyes on the dorsal side, Beecher grouped all Trilobites in which absence of eyes was a primary characteristic in his First Order, Hypoparia. Recent studies and discoveries have led a number of investigators to the conclusion that blindness in the Agnostidae, Eodiscidae, Trinucleidae, Raphiophoridae and Harpedidae is secondary and a degenerative not primitive characteristic. If their position is well taken, then the order should disappear and the families be distributed in the two orders which remain.

The author gives a figure of *Agnostus nudus* exhibiting the facial suture and free cheeks. The facial sutures are not marginal, but intra-marginal. They meet in an obtuse angle at the front and run backward just inside the margin, somewhat like the course of the pre-ocular portion of the suture in an Homalonotus. The sutures keep within the angles, so that the fixed cheeks bear the genal angles—a Proparian characteristic. The sutures in this manner cut off a yoke-shaped area, bounded outside by the facial sutures and inside by a marginal edge, which follows the outline of the base of the elevated portion of the cranidium (the glabella). Both limbs of the yoke taper backward to a point, and it forms a continuous plate, with no vertical or epistomal sutures. This plate has the position and aspect of a large epistomal plate, but, whether called an epistoma or free cheek, the sutures which separate it from the cranidium must be interpreted as the facial sutures.

The author includes only one family under Hypoparia, that of Eodiscidae, Eodiscus as defined by Matthew, 1896, Mollisonia Walc. and Pagetia Walc. The discovery of *Pageria vootes* and *P. clytia,* which bear eyes very close to the lateral margins, seems to be a confirmation of the previous supposition that the Eodoscidae have ventral free cheeks.

Dr. Raymond does not note *Microdiscus caudatus* Delgado, a species with a mucronated pygidium and with free cheeks, from the Cambrian of Portugal.

Delgado's description, p. 349, pl. 3, fig. 12, Fauna Cambrian Haut Alemtejo.

Remarks: "La suture faciale, mais il semble que á partir de l'angle anterieur de l'oeil; il décrit une courbe tres courbe, ayant la convexité tournée en dehors, allant traverser le contour exterieur de la tête prés de la projection de l'oeil; postérieurement il décrit aussi une courbe analogue, atteignant le contour intérieur en dedans de la projection postérieure du centre de figure de l'oeil."

I would suggest the new genus Delgadoia for this species as a type.

Dr. Raymond remarks on Shumardidae, that these little trilobites are too much of a puzzle to be discussed at any length.

The paper ends in a discussion of Harpedidae and Trinucleidae.

The author would not include Orometopus in the last family, and remarks: "It is so unlike any of the Trinucleidae, that the burden of proof that it belongs to that family should be upon those who placed it there."

Under Raphiophoridae, a figure of *Lonchodomas portlocki* Barr., which shows on the ventral side of the head, a yoke-like plate similar to that of *Agnostus nudus,* but instead of being confined to the ventral side it laps over the margins up onto the dorsal side, being separated from the cranidium by a suture which has the course of the ordinary facial suture. The absence of eyes makes the analogy with the ventral plate of Agnostus the more complete.

Having reviewed all the families of the Hypoparia the author remarks that there seems to be a tendency in two directions—in Agnostus and Eodiscidae towards the Proparia, and in the Trinucleidae and Raphiophoridae towards the Opisthoparia.

Mesonacidae:

The author remarks there can be no doubt that *Elliptocephala asaphoides* and other

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RAYMOND (Percy E)—Continued

species of this family show distinct traces of facial sutures, particularly of the part behind the eyes. He gives a figure of the head of a young species of *Elliptocephala asaphoides* Emmons.

In regard to the placing of Calymmenidae, Dr. Raymond follows that of Beecher and places it in the Order Proparia, because the post ocular portion of the facial sutures cut the genal angles in Pharostoma and the genal spines are borne by the fixed cheeks. The free cheeks are decidedly Proparian.

——— and **Barton** (Donald C.) A revision of American species of Ceraurus.

Bull. Mus. Comp. Zoology, vol. LIV, No. 20, 1913.

The authors state that the genus Ceraurus was proposed in 1832 by Green, for a new Trilobite which he describes as *Ceraurus pleurexanthemus*, and refer to Green's Monograph, 1832, p. 83.

The original description of this genus was first published in The Monthly Journal of Geology, June, 1832, p. 560, fig. 10, republished in the monograph.

Although the authors do not quote Corda, they take Reed's classification of Cheirurus into two groups on the form of the pygidae. The first with cyrtometopian pygidium like Ceraurus Green. The second like *Cheirurus insignis* type of pygidium with 3 pairs of subequal pleural spines and a short median spine.

The American species they class as follows:

Ceraturus bispinosus sp. nov.

Glabella or occipital segment strongly spinose with a pair of short, horn-like spines on the crest of the frontal lobe.

Ceraurus numitor Billings. A single medium spine on the neck segment.

Ceraurus mismeri Foerste. Glabella expanding rapidly forward. Genal angles with spines.

Ceraurus hudosoni Raymond. Glabella expanding forward; eyes more than one-half the length of the head; a small form glabella expansion 1 in 4.

Ceraurus pleurexanthemus Green. A medium-sized glabella expansion 1 in 7.

2. *Ceraurus milleranus* M. & G. Eyes one-half the length of the head from the posterior margin.

3. *Ceraurus dentatus* n. sp. Eyes less than one-half the length of the head from the posterior margin.

Ceraurus granulosus sp. nov. Glabella with parallel sides.

The authors note in the Trenton fossils of *Ceraurus pleurexanthemus* Green, from the typical locality, that the pygidium varies on the posterior border with either aspinose and rounded border or with 2, 4 or 5 short spines or denticles.

The *Ceraurus dentatus* sp. nov.

The authors refer to Hall's *C. pleurexanthemus*, Pal. N. Y., vol. 1, p. 1847, pl. 65, figs. 1d, 1h, 1i, and pl. 66, figs. 1a-1g.

The *Ceraurus granulosus* sp. nov. is the *C. pompilius* Raymond, 7th Report, Geol. Vermont.

The *Ceraurus Milleranus* M. & G. is the *Calymmene bucklandi*, Anthony, 1839. (I would suggest the older name.)

The authors refer *Ceraurus rarus* Walcott to *Encrinurus Ceraurus pustulosa* Hall to *Eoharpes*.

To conform with the authors' reclassification, the authors remark that besides the species noted, that Vogdes' Catalogue, made in the year 1893, contains a number of other species, which do not belong to the genus as now restricted, as follows:

Cheirurus apollo Billings, to the genus Anacheirurus. *Cheirurus glaucus*, *C. satyrus* and *C. perforator* Billings, belong to Nieszkowskia (Schmidt subgenus of 1881).

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RAYMOND (Percy E.) and BARTON (Donald C.)—Continued

Cheirurus vulcanus, C. prolificus and *G. mercurius* Billings.

The authors refer with doubt to Pseudosphaerexochus.

They refer *Ceraurus niagarensis* Hall, *Ch. tarquinius* Bill., *Ch. nuperus* Bill. and *C. hydei* Weller, to Cheirurus, though the last two show a curious parallel development in that they have a Ceraurus-like pygidium. (Then why divide the genus?)

Cheirurus sol the type of Raymond's genus Heliomera.

The author classes *Ch. polydrus* Bill. and *Ch. pompilus* Billings, under Ceraurinus Barton, a new genus.

——— and **Narraway** (J. E.) A new American Cybele.

Annals of the Carnegie Mus., vol. 3, No. 4, 1906, pp. 597-602, fig.

Cybele Ella. n. sp.

The glabella described as *Glaphurus primus* Ann. Carnegie Mus., vol. 3, p. 362, belong to the genus Cybele. The Chazy form should be known as *Cybele prima*, and the name *Cybele valcourensis* should be eliminated.

Ravn (J. P. J.) Trilobitfaunaen i den bornholmske Trinucleusskifer Avec résumé en francais.

Danmark's Geologiske Undersogelse, 11 R., No. 10, 1899, pp. 49-62.

Primitia strangulata Salt. *Agnostus trinodes* Salt. *Trinucleus Wahlenbergi* Rouault, *T. Bucklandi* Barr. ? *Ampyx Portlocki* Barr., *A. gratus* Barr. *Dionide euglypta* Ang. *Remopleurides radians* Barr. *Calymene* sp. *Asaphus (Ptychopyge) nobilis* Barr. *Illaenus leptopleura* Linrs. *Illaenus Angelini* Helm. *Illaenus* sp., *I. (Panderia) megalophthalmus* Linrs. *Phacops recurvus* Linrs. *Cheirurus insignis* Beyr. ? *Pseudopharexochus laticeps* Linrs. *Cybele* sp. *Dindymene ornata* Linrs. *Acidaspis (Cyrtometopus?) decacantha* Ang. *Phillipsia parabola* Barr.

Redlich (K.) The Cambrian Fauna of the Eastern Salt range.

Memoir Geol. Survey India, new series, vol. 1, No. 1, 1899, pp. 1-13, plate.

Hoeferia noetlingi n. gen. et sp. (non Hoeferia Bittner Moll. 1895.)

Dr. Redlich compares this form with the genera *Protolenus, Paradoxides* and *Metatoxides.*

The genus is now referred to *Redlichia,* Crossman, see Rev. Critique Pal., 1902, sixieme Ann., p. 52.

Reed (F. R. Cowper). Woodwardian Museum Notes. On *Phacops (Chasmops) Marri.*

Geol. Mag. London, Decade iv, vol. 1, 1894, p. 241.

——— Woodwardian Museum Notes. New Trilobites from the Bala beds of the County Waterford.

Geol. Mag. London, Decade iv, vol. 8, 1895.

Cybele Tramorensis n. sp.

Trinucleus hibernicus nov.

——— The fauna of the Keisley Limestone.

Quart. Jour. Geol. Soc. London, vol. 52, 1896, pp. 407-437, plates.

Agnostus cf. *galba* Bill. *Ampyx binodulosus* n. sp. *Tiresias insculptus* McCoy.

Remopleurides Colbii Portl., *R. longicostatus* Portl. *Cyphoniscus socialis* Salt. *Calymmene Blumenbachi* var. *Caractaci* Salt.

Illaenus Bowmani Salt., also var. *brevicapitatus* and *longicapitatus. Illaenus fallax* Holm., *I. Roemeri* Volb., *I. caecus* Holm., *I. galeatus* n. sp.

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REED (F. R. Cowper)—Continued

Cheirurus bimucronata Murch. var. a *C. cancrurus* Salt., *C. Keisleyensis* n. sp., *C.* cf. *glaber* Ang., *C.* cf. *clavifrons* Dalm. ? *C. (Pseudosphaerexochus) conformis* Ang., *C. (P.) subquadratus* n. sp.

Sphaerocoryphe granulata Ang. *Sphaerexochus mirus* Beyr., *S. latirugatus* n. sp. *Straurocephalus Murchisoni* Barr.

Acidaspis convexa n. sp. *Lichas laxatus* McCoy, *L. affinis* Ang., *L. conformis* Ang. var. *Keisleyensis, L. Hibernicus* Portl., *L. bifurcata* n. sp., *L. bulbiceps* Phil. MS.

Cyphaspis ? Harkessi n. sp., *C. (Tornquistia)* n. subgen. *Nicholsoni* n. sp.

Phillipsinella parabola Barr. *Harpes Wegelini* Ang., *H. costatus* Ang.

Harpes species a-b.

——— Woodwardian Museum Notes. On the evolution of the genus Cheirurus.

Geol. Mag. London, Decade iv, vol. 3, 1896, pp. 117-123 and pp. 161-167.

The author arranges the genus Cheirurus as follows:

1. Cheirurus (Anacheirurus) type, *C. Frederici* Salt. Cambrian.

The Tremadoc species has 11-12 thoracic segments, each of which is deeply grooved along its middle. Pygidium has 4 rings and 3 short pleural lobes on each side, which are grooved throughout and extend over the margin into spines.

2. Cheirurus (Eccoptocheile) type, *C. claviger* Beyrich. Ordovician.

Glabella oval, often much inflated. Thorax 10 segments, grooved imperfectly.

3. Cheirurus (Cyrtometopus) type, *clavifrons* Dalm. Ordovician-Silurian.

4. Cheirurus (Hemisphaerocoryphe) type, *pseudo-hemicranium,* Nieszk. Ordovician.

The basal lobes of the glabella are separated by a strong glabella, side furrow joining the neck furrow. These lobes are less elevated than the rest of the glabella.

5. Cheirurus (Sphaerocoryphe) type, *S. cranium* Kutorga. Ordovician.

6. Cheirurus (Nieszkowskia) type, *cephaloceros,* Nieszk. Cambrian and Ordovician.

7. Cheirurus (Pseudosphaerexochus) type *hemicranium* Kutorga. Ordovician.

The characteristics of the above two genera are 12 thoracic segments and the presence of a longitudinal row of puncta instead of a furrow on the inner portion of each pleura.

8. Cheirurus (Group 1 with cyrtometopian pygidium) type, *C. Exsul* Beyr. Ordovician-Silurian.

In this group the anterior pleura of the tail are enlarged and project behind the posterior ones.

Barton refers this group to Ceraurus.

9. Cheirurus Group 2 type *C. bimcronatus* Murch. Ordovician-Silurian.

In this group the pygidium has 3 pair of pleura with free ends. The fourth pair are represented by a single medium terminal piece.

Barton refers this group to Cheirurus.

10. Cheirurus (Crotalocephalus type, *C. articulata* Münster. Devonian.

This genus is almost entirely restricted to the Devonian. The important subgeneric characteristics are the continuous first and second side furrows of the glabella, the triangular basal lobes, which nearly or quite meet in the centre of the glabella at their apices, and the nearly straight obliquely directed third side furrows.

——— *Trinucleus seticornis.*

Geol. Mag. London, Decade iv, vol. 4, 1897, pp. 427-428.

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REED (F. R. Cowper)—Continued

——— Fossils from the Grey shales marked on the map as Trilobite shales.

Quart. Jour. Geol. Soc. London, vol. 53, 1897, p. 538.
Trinucleus seticornis His. var. *portrainensis* n. var.

——— Notes on the Geology of the County Waterford.

The fauna of the Ordovician beds near Tramore.
Geol. Mag. London, Decade iv, vol. 4, 1897, pp. 502-512. List of fossils.

——— Notes on the affinities of the genera of Cheirurus.

Geol. Mag. London, Decade iv, vol. 5, 1898, pp. 206-214.

——— Blind Trilobites.

Geol. Mag. London, Dec. iv, vol. 5, 1898, pp. 439-447, and 493-506.
The author divides the Blind Trilobites into two divisions as follows:

Group 1—Primitive forms.
Agnostus Cambrian—Ordovician.
Microdiscus Cambrian.
Trinucleus Ordovician.
Ampyx Ordovician-Silurian.
Dionide Ordovician.
?*Salteria* Ordovician.
Endymionia Ordovician.
Tiresias Ordovician.
Conocoryphe s. str. Cambrian.
Ctenocephalus Cambrian.
Erinnys Cambrian.
Carausia Cambrian.
Dictyocephalites Cambrian.
Eryx Cambrian.
Aneucanthus Cambrian.
Anopocare Cambrian.
?*Avalonia* Cambrian.
?*Bathynotus* Cambrian.
Carmon Ordovician.
Holocephalina Cambrian.
?*Telephus* Ordovician.
Dindymene Ordovician.
Areia Ordovician.
Placoparia Ordovician.
Prosopicus.
Isocolus Ordovician.
Typhloniscus, Lower Devonian.
?*Cyphoniscus* Ordovician.
Conophrys probably—Ordovician.
Shumardia larval forms—Ordovician.

Group 2—Adaptive forms.
Harpes benignensis Barr., Etage Dd. 1.
Illaenus Angelini Holm.
—*aratus* Barr., Etage Dd. 1.
—*caecus* Holm., Keisley Limestone.
—*galeatus* Reed, Keisley Limestone.
—*Katzeri* Barr., Etage Dd. 1.
—*leptopleura* Linnars., Trinucleus Beds.
—*Zeidleri* Barr., Etage Dd. 5.
Proetus dormitans Richter, Tentaculites Beds.
Proetus expansus, Tentaculites Beds.
Acidaspis myops Richter, Tentaculites Beds.
Phacops (Trimerocephalus) laevis, Münst. Upper Devonian.

The genera Dindymene Typhloniscus and Carmon the author places with some hesitation in Group 1, which may be regarded as reversionary or degenerate types on account of their primitive adult cephalic features, combined with morphological characters.

The genera Salteria, Avalonia, Bathynotus, Telephus and Cyphoniscus may be ultimately found to possess eyes.

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REED (F. R. Cowper)—Continued

——— Woodwardian Museum Notes. A new Carboniferous Trilobite.

Geol. Mag. London, Decade iv, vol. 6, 1899, pp. 241-245, plate.

Phillipsia cracoensis n. sp.

——— Woodwardian Museum Notes. A new Trilobite from Mount Stephen Field, B. C.

Geol. Mag. London, Decade iv, vol. 6, 1899, pp. 358-361, figure.

Oryctocephalus Reynoldsi n. sp.

——— The Lower Palæozoic bedded rocks of County Waterford.

Quart. Jour. Geol. Soc., London, vol. 55, 1899, pp. 718-772, pl. 49.

Asaphus Haugtoni n. sp. *Çybele Macheneryi* n. sp., *C. sex-tuberculata* n. sp. *Encrinurus fallax* n. sp. *Illaenus Davisi* var. *pseudolimbatus* n. sp. *Remopleurides Portlocki* n. sp., *R. Salteri* n. sp., *R. tuberculatus* n. sp. *Tramoria punctata* n. sp.

The author abandons this genus and refers the species to *Apatokepalus punctatus*, Geol. Mag., Dec. 4, vol. 7, p. 46, 1900.

——— Woodwardian Museum Notes. On the British species of the genus Conocoryphe.

Geol. Mag. London, Decade iv, vol. 7, 1900, pp. 250-257.

The genus Conocoryphe sens. str., is confined in Britain to the Lower and Middle Cambrian beds.

The author reclassifies the species as follows:

Euloma abdita Salt. *Solenopleura applanata* Salt. *Olenus ? bucaphalus* Belt. *Conocoryphe (Bailiella) bufo* Hicks. *Ctenocephalus coronatus* Barr. *Solenopleura ? depressa* Salt.

The *C. ? ecorne* Ang. Salter, Cat. Camb. Sil. Foss., p. 12, is a species of *Peltura*.

Conocoryphe ? Homfrayi Hicks. *Olenoides humerosus* Salt. *Apatokephalus invitus* Salt. *Olenus (Parabolinella?) longispina* Belt. *Conocoryphe Lyelli* Hicks. *Peltura ? malvernia* Phillips. *Euloma monile* Salt. *Conocoryphe ? perdita* Hicks. *Olenus (Parabolinella) Planti* Salt. *Olenus (Cyclognathus) simplex* Salt. *Ctenocephalus (Hartella) solvensis* Hicks. *Solenopleura ? variolaris* Salt. *Angelina verisimilis* Salt. *Olenus (Parabolinella?) Williamsoni* Belt.

——— Woodwardian Museum Notes. Salter's undescribed species.

Geol. Mag. London, Decade iv, vol. 7, 1900, pp. 303-308, plate.

Olenus (Parabolinella) Planti Salter, Cat. Camb. Sil., Foss, p. 11.

Olenus (Ctenopyge) expansus Salt., *ibid.*, p. 12.

Neseuretus recurvatus (Hicks) Salter, Cat. Camb. Sil., Foss, p. 22.

Neseuretus quadratus (Hicks) Salter, Cat. Camb. Sil., Foss, p. 22.

Neseuretus sp. *(Homalonotus monstrator)* Salter, Cat. Camb. Sil., Foss, p. 22.

——— Woodwardian Museum Notes. Salter's undescribed species No. 2.

Geol. Mag. London, Decade iv, vol. 8, 1901, pp. 5-14, plate.

Lichas scutalis Salter MSS. *Proetus Fletcheri* Salt., Cat. Camb. Sil., Foss, p. 134 (a 825, a 828).

——— Woodwardian Museum Notes. Salter's undescribed species No. 3.

Geol. Mag. London, Decade iv, vol. 8, 1901, pp. 106-110, plate.

Phacops (Odontocheile) caudatus var. *corrugatus* Slater.

Encrinurus multiplicatus Salt., Cat. Camb. Mus. Sil., Foss, p. 51.

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REED (F. R. Cowper)—Continued

——— Notes on the genus *Lichas*.

Quart. Jour. Geol. Soc. London, vol. 58, 1902. p. 50.

The author classifies the Lichadidae into two groups as follows:

Group 1—Protolichas:

Sec. A. Corydocephalus type *L. plamatus* Barr.
—B. Dicranopeltis type *L. scaber* Beyr.
—C. Platylichas type *L. margaritifer* Nieszk.
—D. Metopolichas type *L. verucosus* Eichw.
—E. Metalichas type *L. cicatricosus* Schm.
—F. Uralichas type *L. Ribeiroi* Delg.
—G. Ceratarges type *L. armatus* Goldf.
—H. Oncholichas type *L. ornatus*.

Group 2—Deuterolichas:

Sec. A. Hopolichas type *L. tricuspidatus* Beyr.
—B. Homolichas type *L. angustus* Beyr.
—C. Conolichas type *L. aequiloba* Steinh.
—D. Echinolichas type *L. Eriopis* Hall.
—E. Leiolichas type *L. illaenoides* Nieszk.
—F. Paralichas type *L. dalecarlicus* Ang.
—G. Terataspis type *L. grandis* Hall.
—H. Ceratolichas type *L. gryps* Hall.

The classification is based on (1st) a group with a pair of bi-composite lateral lobes to the glabella, and a more or less definite fourth pair of lateral lobes; (2nd) a group with a pair of tri-composite lateral lobes, originating by the fusion of the fourth pair, with the bi-composite pair of the preceding group.

——— Woodwardian Museum Notes. *Brachymetopus Strzeleckii* McCoy.

Geol. Mag. London, Decade iv, vol. 10, 1903, pp. 193-197, figure.

The author remarks (on p. 196): "It seems open to question, whether the European species of Brachymetopus should not be regarded as constituting a distinct group or subgenus, for which the name Brachymetopina may be suggested."

——— The Lower Palæozoic Trilobites of the Girvan District, Ayrshire.

Palaeontological Society London, Part 1, pp. 1-48, plates 1-6, December, 1903.
Part 2—pp. 49-96, plates 7-13, December, 1904.
Part 3—pp. 97-186, plates 14-20, December, 1906.

List of the species:

Agnostidæ—*Agnostus agnostiformis* McCoy, *A. girvanensis* n. sp., *A. perrugatus* Barr., *A. tardus* Barr.

Harpedidæ—*Harpes Flanagani* Portl. ? *H.* sp. (a) to (c).

Trinucleidæ—*Trinucleus Bucklandi* Barr., *T.* ? *Maconochiei* Eth. & Nich., *T. subradiatus* n. sp., *T.* sp. ind. (a) to (g). *Ampyx depressus* Ang., *A. Drummuckensis* n. sp., *A. Hornei* Eth. & Nich., *A. incurvus* n. sp., *A. Macallumi* Salt., *A. mammillatus* var. *Austini* Portl.? *A.* cf. *foveolatus* Ang., *A.* cf. *scanicus* Ang. *Dionide Lapworthi* Eth. and Nich., *D. Richardsoni* n. sp.

Olenidæ—*Triarthrus Becki* Green ? *Apatokephalus* sp. *Remopleurides Barrandei* Eth. and Nich., *R. (Teratorhynchus) bicornis* n. sp., *R. Colbii* Portl. ? *R. correctus* n. sp., *R. dorsospinifer* Portl., *R. longicostatus* Portl., *R. Salteri* Reed *girvanensis* var. nov., *R.* cf., *nanus* Leucht., *R.* cf., *platyceps* McCoy. *Shumardia scotica* n. sp. *Salteria primaeva* Wyv. Thom. *Telephus fractus* Barr.

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REED (F. R. Cowper)—Continued

Asaphidæ—*Asaphus (Isotelus) gigas* DeKay ? *A. Isotelus instabilis* n. sp., *Asaphus* sp. *Stygina latifrons* Portl. *Cyclopyge armata* Barr., *C. rediviva* Barr., *C.* cf. *gigantea* Barr. *Bohemilla* sp. *Illaenus aemulus* Salt., also var. *I. balclatchinensis* n. sp., *T. Barriensis* Murch., *I. Bowmani* Salt ? and var. *longicapitatus* Reed, *I. Davisi* Salt., *I. extensus* n. sp., *I. latus* McCoy, *I. Macallumi* Salt., *I. memorabilis* n. sp., *I. Murchisoni* Salt. ? *I. nexilis* Salt., *I. Portlocki* Salt., *I. shallochensis* n. sp., *I. Thomsoni* Salt., *I.* cf. *oculosus* Holm., *I.* cf. *perovalis* Murch. *Illaenus* sp.

Proetidæ—*Proetus girvanensis* Eth. and Nich., *P. latifrons* McCoy, *P. procerus* Eth. and Nich., *P. pseudolatifrons* n. sp., *P. Stokesi* Murch., *P.* cf. *obconicus* Lindstr., *Proetus* sp. *Cyphaspis megalops* McCoy. *Arethusina Konnincki* Barr. ? *Phillipsinella parabola* Barr. *Menocephalus ? (Tornquistia)* cf. *Nicholsoni* Reed.

Bronteidæ—*Bronteus Andersoni* Eth. and Nich., *B. craigensis* n. sp., *B. Grayi* n. sp. *Bronteus* sp. ind. (a) and (b). *Bronteopsis ardmillanensis* n. sp., *B. scotia* Salt.

Lichadidæ—*Lichas (Corydocephalus) anglicus* Beyr.
Lichas (Corydocephalus) Geikei Eth. and Nich.
Lichas (Corydocephalus) scutalis Salt.
Lichas (Corydocephalus) cf. *Wesenbergensis* Schm.
Lichas (Platylichas) Grayi Fletch., also var. *scoticus.*
Lichas (Platylichas) laxatus McCoy.
Lichas (Metopolichas) bulbiceps Phill. var. aff. *marginatus* Lindstr.
Lichas (Amphilichas) hibernicus Portl.
Lichas (Conolichas) cf. *aequiloba* Steinh. also sp. ind. (a).
Lichapyge ? problematica n. sp.

Acidaspidæ—*Acidaspis Barrandei* Fletch. and Salt., *A. callipareos* Wyv. Thom., *A. coronata* Salt., *A. deflexa* Lake, *A. Grayae* Eth., *A. hystrix* Wyv. Thom., *A. lalage* Wyv. Thom., *A. dalecarlica* Tornq.

Encronuridæ—*Encrinurus punctatus* Brunn var. *calcareus, arenaceus.* *Encrinurus multisegmatatus* Portl. *Cybele* cf. *aspera* Linnrs., *C. bellatula* Dalm., *C. Loveni* Linrs. var nov. *girvanensis, C. verrucosa* Dalm., *C.* sp. ind. (a) and (b). *Dindymene cordai* Eth. and Nich.

Calymmenidæ—*Calymmene Blumenbachi* Brong. also var. *drummuckensis, C. cambrensis* Salt., *C. planimarginata* n. sp., *C.* sp. ind. (a) and (b).

Cheiruridæ—*Cheirurus bimucronatus* Murch., *C. gelasinosus* Portl., also var. *Cheirurus (Cyrtometopus) octolabatus* McCoy, *C. (Nieszkowskia) unicus* Wyv. Thom., *C. (Sphaerocoryphe) Thomsoni* n. sp., *C. (Youngia) tripinosus* Young. *Cheirurus* sp. (a) and (b). *Deiphon Forbesi* Barr. *Sphaerexochus mirus* Beyr. *Staurocephalus globiceps* Portl. *Pliomera* sp.

Phacophidæ—*Phacops (pterygometopus) Brongniarti* Portl.
Phacops (Phacopidella) Downingiae Murch.
Phacops (Phacopidella) elegans Sars and Boeck.
Phacops (Chasmops) Bisetti n. sp.

——— Sedgwick Museum Notes. New fossils from the Haverford-west District.

Geol. Mag. London, Decade v, vol. 1, 1904, pp. 106-109, plate.
Phacops Robertsi n. sp.

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REED (F. R. Cowper)—Continued

——— Sedgwick Museum Notes. New fossils from the Haverford-west District. No. 2.

Geol. Mag. London, Decade v, vol. 1, 1904, pp. 383-388, plate.

Phacops (Dalmanites) socialis Barr. var. *P. (Dalmanites)* aff. *incertus* Deslong. *Phacops (Chasmops) conicophthalmus* Boeck. *Phacops (Chasmops) macroura* Sjogren. *Encrinurus multisegmentatus* Portl.

——— Sedgwick Museum Notes. New fossils from the Haverford-west District. No. 3.

Geol. Mag. London, Decade v, vol. 2, 1905, pp. 97-104, plate.

Harpes sp.— *Ampyx* cf. *rostratus* Sars. *Remopleurides Salteri* Reed var. *girvanensis*. *Cyphaspis megalops* (McCoy), *C.* cf. *Harknessi* Reed. *Acidaspis (Ceratocephala) Turnbulli* nov., *A. (C.) sladensis* nov. *Lichas (Metopolichas) affins* Ang. var., *L. (M.) laciniatus* Dalm ? *L. (Platylichas) margiritifer* Nieszk. var. *Cheirurus (Pseudosphaerexochus)* aff. *subquadratus* Reed.

——— The classification of the genus Phacopidæ.

Geol. Mag. London, Decade v, vol. 2, pp. 171-178 and 224-228.

The author classifies the genus as follows:

1. Sub-family Dalmanitinae subgenera Dalmanitina:

SYNPHORIA.
- Dalmanites sens str. Haumanannia.
- Asteropyge.
- Odontocephalus.
- Corycephalus.
- Malladaia.
- Coronura.
- Probolium.
- Cryphina.

2. Sub-family phacopinae. 2—Genus Phacops, subgenera Phacopidella:
   - Phacops sens str.
   - (Somatrikelon).
   - Trimerocephalus.
3. Sub-family Pterygometopinae, Genus Pterygometopus:
   - Subgenera Pterygometopus sens st.
   - Chasmops.
   - Homalops.
   - Monorakos.

——— Sedgwick Museum Notes. Crustacea from Girvan.

Geol. Mag., Decade v, vol. 4, 1907, pp. 108-115, plate iv.

Anatifopsis balclatchiensis n. sp. *Pinnocaris curvata* n. sp. *Solenocaris solenoides* Young. *Ceratiocaris (Solenocaris?)* sp. *Helminthochiton Grayiae, H. Woodw. Chiton* sp.

——— Sedgwick Museum Notes. A new species of Lichas.

Geol. Mag., Decade v, 1907, vol. iv, pp. 396-400, plate xvii.

Lichas (Homolichas) melmerbiensis n. sp.

——— New fossils Heverfordwest.

Geol. Mag., Decade v, vol. v, 1908, pp. 433-436, pl. xiv.

Typhloniscus princeps n. sp.

The only species of this genus previously described was *T. Baini* Salter, from South Africa.

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REED (F. R. Cowper)—Continued

——— A new species of Cyclus from the Carboniferous Limestone of Ireland.

Geol. Mag., Decade v, vol. v, 1908, pp. 551-552.

Cyclus simulans n. sp.

——— On *Phacops Weaveri*, Salter.

Geol. Mag., Decade v, vol. vi, 1909, p. 69.

Refers only the *Phacops Weaveri* Salt. Mong. Brit. Tril., plate iv, fig. 7, from Llandovery rocks of the Tortworth area.

——— Rocks of the Toumakeady District. Vii Palæontological Appendix.

Quart. Jour. Geol. Soc. London, vol. 65, 1909, pp. 151-152, pl. 6.

Illaenus Weaveri n. sp. closely resembles, *I. esmarkii* Schloth., *I.* aff. *chudleighensis* Holm., *Pliomera* aff. *Fischeri* Eichw., *P.* aff. *Barrandei* Billings.

Cybele connemarica n. sp. Encrinurus sp.

The author compares *E. varicostatus* Walc., and *E. vannulus* Clarke. It differs in the shape of the pygidium and course of the lateral ribs. Acidaspis sp. Apatocephalus sp. ? and *Telephus hibernicus* n. sp. also Symphysurus ? sp.

——— The Cambrian fossils of Spiti.

Memoirs Geol. Sur. of India, ser. xv, vol. 7, Memoir No. 1, Calcutta, 1910, 76 pp., plates 1-6.

The author describes the following species of Trilobites:

Agnostus spitiensis n. sp.

There are considerable affinities between this species and *A. acadicus* Hartt, also with *A. montis* Matthew.

Microdiscus: The author uses *M. punctatus* Salter for the type of the genus and not *M. quadricostatus* Emmons, certainly the young of the Trinucleus from the Hudson River group; and remarks, "Should *Pemphigaspis bullata* Hall, prove to belong to this genus, this name will have to be adopted as Emmons founded his genus Microdiscus on a young of another genus."

Matthew Trans. N. Y. Acad. Sci., 1896, p. 236, remarks, as a general rule, in the genus Microdiscus the number of rings in the axis of the pygidium increase according to the geological age of the species. The majority of those of the Olenellus zone have but few rings (4 to 6), but in the Paradoxides zone species with many rings (8 to 10, even 12) are multiplied.

He divides the genus into four Sections: With long glabella—Section 1, Lobatus; Section 2, Speciosus. With short glabella—Section 3, Dawsonia; Section 4, Eodiscus.

The following Himalayan species are described and illustrated:

Microdiscus Griesbachi sp. nov. The species agrees in general characters with *M. connexus* Walcott, *M. haimantensis* sp. nov. *Redlichia Noetlingi* Redlich.

The author remarks that this species is very closely related to *R. nobilis* Walcott. Indeed, it seems difficult to separate the new Chinese species *R. chinensis* Walcott, *R. finalis* Walcott and *R. nobilis* Walcott, by any strongly marked and constant features from the Indian species.

Zacanthoides indicus sp. nov. *Oryctocephalus Salteri* sp. nov., *O.* cf. *Reynoldi* Reed.

Under the genus Ptychoparia, Corda, 1847, the author remarks:

There has been extraordinary diversity in the use of the generic name Ptychoparia, and in spite of the recent efforts of palæontologists to bring order out of chaos it cannot be said that uniformity of usage prevails at the present date.

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REED (F. R. Cowper)—Continued

He also remarks with regard to Ptychoparia that there happily cannot be any dispute as to the type of the genus, for Corda's first described species, *Ptychoparia striata* Emmrich, is well known and universally acknowledged.

Reed quotes Corda's original description of the genus and remarks that Pompeckj agrees with this strict limitation of the generic name Ptychoparia, but instead of regarding it as a subgenus of Conocephalites, as Wallerius did, prefers to place the latter as a subgeneric division of the genus, which is followed by the author with *C. Emmerichi* Barrande, as a type.

With regard to the genus Liostracus Angelin, the author quotes Matthew's divisions of the genus Ptychoparia and Liostracus, and remarks that the only constant differentiating feature of value is the shape of the genal angle, spined or rounded.

Matthew takes *L. aculeatus* as a type, but Brögger is followed by Wallerius in regarding the genal angles as typically spined, as in *L. costatus* Angelin. Reed places the genus as a subgenus to Ptychoparia.

Also Conocephalites, with *C. Emmrichi* Barrande, as a type. The leading characteristics of it are: 1—the long narrow eyes; 2—the position of the eyes near the glabella; 3—the course of the facial sutures, which behind the eyes run out almost horizontally before bending back; 4—the furrow on the eye lobes; 5—the absence of occular ridges; 6—the flat border.

The author describes *Ptychoparia spitiensis* sp. nov., *P. Stracheyi* sp. nov., *P. urceolata* sp. nov., *P. consocialis* sp. nov., *P. admissa* sp. nov., *P. pervulgata* sp. nov., *P. maopoensis* sp. nov., *P. defossa* sp. nov. *Ptychoparia (Liostracus) civica* sp. nov.

Subgenus Conocephalites: *Ptychoparia (Conocephalites) memor* sp. nov., *P. (C.) hesterna* nov. sp.

Subgenus *A. Ptychoparia hostilis* sp. nov., *P. praeterita* sp. nov.

Subgenus *B. Ptychoparia himalaica* sp. nov.

Bathyuriscus Stoliczkai sp. nov.

Dicellocephalus interpres sp. nov. *The author* compares it with *D. Dewinei* Billings and other species, remarking that *D. Dewinei* and *D. Hisingeri* of Billings cannot rightly be retained in the genus Dicellocephalus.

Genus Agraulos Corda, *A.* aff. *Roberti* Matthew, *A. simulans* sp. nov., *A.? fervidus.*

Anomocare Angelin, 1854, *A. conjunctiva* sp. nov.

The peculiar course of the marginal furrow, so as to make a broad V in front of the glabella, occurs also in several species attributed to Ptychoparia, *P.* sp. *ind.* Walcott, from Yellowstone, and *P. teucer Billings.* The author compares *A. Angelini* Grönwall. Anomocare sp.

Schantungia Lorenz, 1906, *S.* cf. *frequens* Dames.

Reed remarks, that unfortunately the name Schantungia is apparently preoccupied, Walcott having employed it for a type of trilobites from China in 1905, but without a figure. If it is proved that the type of Walcott's Shantungia and Lorenz's Schantungia belong to different genera a new name must be given to this group or genus containing Dames' *C. frequens.*

Olenus haimantensis sp. nov.

The author compares *O. attenuatus* Boeck.

——— Palæontological Notes.

The Ordovician of the Glensaul District by C. I. Gardiner and S. H. Reynolds.

Quart. Jour. Geol. Sec. London, vol. 66, 1910, pp. 271-278, plates 20-2

The author describes *Illaenus Weaveri* Reed, *Niobe* sp. *Nileus armadillo* Dalman. *Bathyurellus glensaulensis* sp. nov.

This genus has not been previously recorded from the British Isles.

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REED (F. R. Cowper)—Continued

The author compares *B. formosus* Bill., *B. expansus* Bill. and *B. brevispinus* Raymond. *Bathyurus* cf. *Timon* Bill., *B.* aff. *nero* Billings.

Pliomera pseudoarticulata Port. *Encrinurus octocostatus* sp. nov. *Phacop (Chasmops)* aff. *Odini* Eichwald.

——— Sedgwick Museum Notes. *Dionide atra*, Salter.

Geol. Mag., Decade 5, No. 5, vol. 9, p. 200, plate 11.

The author includes the *Trinucleus Ramsayi* Hick., 1875, under this species. The author remarks the many points of affinity possessed by the head shield with other genera, indicate the intimate relations of Dionide with Harpes, Harpides and Erinnys.

——— New fossils from the Dufton Shale.

Geol. Mag., Decade v, vol. 7, No. 5, 1910, p. 211, plates 16 and 17.

Trinucleus Nicholsoni sp. nov.

The author remarks: *T. ornatus* (Sternb.) Barrande seems closely allied to our Dufton species in the shape of the head shield, nuchal spine, pits in axial furrows, tubercle on glabella, and radial arrangement of the pits on the fringe, but these pits are more numerous and smaller.

Acidaspis semievoluta sp. nov. *Homalonotus ascriptus* sp. nov.

Ostracoda: *Beyrichi (Ceratopsis) duftonensis* sp. nov., *B. (Ctenobolbina) ? superciliata* sp. nov., *B. (Tetradella) Turnbulli* sp. nov.

——— Sedgwick Museum Notes. On the genus Trinucleus.

Geol. Mag. Decade v, vol. 9, p. 346, pl. 18, 1912.

The author discusses the fringe of Trinucleus, the double nature of the fringe, the character of the pits, arrangement of the pits. Difference in the upper and lower surfaces of the fringe, the outer and inner bands and the position of the girder.

The plate illustrates *Trinucleus concentricus* Eaton, *T. hibernicus*, *T. fimbriatus* Murch., *T. seticornis* His., *T. Nicholsoni* Reed, *T. subradiatus* Reed, *T. favus* Salter and *T. Murchisoni* Salter.

——— Sedgwick Museum Notes. On the genus Trinucleus.

Geol. Mag., Decade 5, vol. 9, pp. 385-394, pl. 19, part 2, 1912.

The author figures the upper and lower surface of fringe of five species of the genus Trinucleus.

Trinucleus hibernicus Reed, *T. fimbriatus* Murch., *T. Murchisoni* Salter, *T. Nicholsoni* Reed and *T. seticornis* Hisinger.

Reid (James) and **Macnair** (Peter). On the genera Psilophyton, Lycopodites, Zosterophyllum and Parka decipiens of the Old Red Sandstone of Scotland, their affinities and distribution.

Trans. Edinb. Geol. Soc., vol. 7, 1899, pp. 368-380.

Remelé (A.) Zwei neue Trilobiten aus undersilurischen Diluvial Geschieben von Eberswale.

Zeitschr. Deutsch Geol. Ges., vol. 37, 1885, p. 1032.

Rhinaspis erratica n. sp. and subgen. of Meglaspis.

Hydrocephalus Hauchecornei gen. et sp. nov. of Ampyx.

Remes (M. Poznamky). Trilobitech Celechovského Devonu.

Prostejove, 1913.

The author describes *Bronteus granulata* Goldf. *Lichas* cf. *armata* Goldf. *Cyphaspis ceratophthalmoides* Rud. Richter. *Proetus moravicus* Smycka. *Schizoproetus celechovicensis* Smycka (emend Rud. Richter).

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REED (F. R. Cowper)—Continued

Dechenella subgen. Eudechenella n. gen.

Dechenalla (Eudechenella) rittbergensis. H. Zimmermann emend Rud. Richter.

The author illustrates *Cyphaspis ceratophthalmoides* Rud. Richter.

Reynolds (S. H.) Certain fossils from the Lower Palæozoic rocks of Yorkshire.

Geol. Mag. Decade iv, vol. 1, 1894, p. 108, plate 4.

The author illustrates *Staurocephalus* cf. *Murchisoni* Barr.—a pygidium. *Dindymene Hughesiae* Roberts MS., entire figure.

The author compares the new species with *D. ornata* Linrs., *D. Frederici Augusti* Barr., *D. Haidingeri* Barr and *D. Cordai* Eth. and Nich., remarking the differences in the number of large tubercles on the glabella in each and the new form.

Richter (Reinard) and **Unger** (Franz). Beitrag zur Paläontologie des Thuringer Waldes.

K. Akad. der Wissench. mathem. naturw Bd. cixi, 1856.

Cytherina: *Phacops ? granulatus* Münster. *Calymene marginata* Münster, *C. furcata* Münster.

Phacops cryptophthalmus Emm., *P. macrocephalus* Richter, *P. mastophthalmus* Richter Phacops sp.

Dalmanites punctata Steininger, Cylindraspis sp., *C. latispinosa* Sandb. Pygidium. ?

Cypridina serrato-striata Sandb., *C. globulus* Richter, *C. gyrata* Richter, *C. taeniata* Richter, *C. calcarata* Richter.

Richter (Rudolf). Beiträge zur Kenntnis devonischer Trilobiten ans dem Rheinischen Schiefergebirge Vorbericht zu einer Monographie der Trilobiten der Eifel. Dissert, Marburg, 1909.

The author describes *Proetus Cuvieri* Steininger, 1831, including two var. *laevigata* Goldf. and *granulosa* Goldf. *Proetus cornutus* Goldf., referring *Proetus Holzapfeli* to the species. *Proetus tenuimargo* nov. for *P. cornutatus* Beyr. non Goldf. *Proetus (Tropidocoryphe) filicostus* Novák, 1890, *P. crassimargo* Römer.

Cyphaspis ceratophthalmus Goldf. and *C. hydrocephala* Römer.

Dechennella Verneuili Barr., *D. Burmeisteri* nov. for *Tril verticalis* Burmeister, 1843, pl. V, fig. 9a, not 9b. *Dechenalla Kayseri* nov., *D. Romanovski* Tschern, *D. Tschernyschewi* nov., *D. uralica* nov.

Harpes macrocephalus Goldf. refers *H. ungula* Burmeister, 1843, to this.

Lichas armata Goldf. var. *berolinensis* and *geesiana* nov. *Lichas beryllifera* nov., *L. parvula* Noväk, syn. *L. Haueri* Barr., pl. 28, fig. 38, non 39-40.

Acidaspis elliptica Burmeister refers *Arges armata* Goldf. 1839, pl. 33, fig. 1e and d, non a, b, c. *Odontopleura dentata* Goldf., 1843, and *Acidaspis armata* Römer, 1876, Atlas, pl. 31, fig. 7, to this species.

Acidaspis aries nov., *A. radiata* Goldf. refers *A. pilata Whidborne,* 1889, and *A. lacerata* Barr. to this species.

Cryphaeus rotundifrons Emm. the author refers C. laciniatus Roemer, and *C. acutifrons* Schlüter, to this species.

Cryphaeus Drevermanni nov. for *C. laciniatus* Drevermann, 1902. *Cryphaeus boopis* nov., *C. Kochi* Kayser, *C. Lethaeae* Kayser, for *Pleuracanthus laciniatus* Roemer, 1844, and that of Lethaea Pal. Atlas, pl. 25, fig. 10, 1876.

Cryphaeus diadema nov., *C. cometa* nov., *C. punctatus* Steininger, 1833, the *Calymmene archnoides* Höninghaus and other authors.

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RICHTER (Rudolf)—Continued

Cryphaeus stellifer Burmeister, 1843.
Acaste Schmidti nov. *A. Henni* nov., *A. nolens* nov.

——— Das übergreifen der pelagischen Trilobitengattungen Tropidocoryphe and Thysanopeltis in das normale Rheinische Mitteldevon der Eifel und Belgiens.

Centralblatt für Mineral Geol. and Palæont. Jahrg., 1914, No. 3.

The author gives a figure in the text of *Tropidocoryphe Barroisi* Maillieux and refer to the genus *Tropidocoryphe ascania* (Corda), *T. memmon* (Corda), also *T. filicostata* Novák, the genotype.

The author figures *Thysanopeltis acanthopeltis* (Schnur.).

———Über das Hypostoma und einige Arten der Gattung Cyphaspis.

Centrabatt für Mineral Geol. Palæont. Jahrg., 1914, No. 10.

The author illustrates *Cyphaspis hydrocephala* Röm., *C. ceratophthalmus* Goldf., and two new species: *Cyphaspis ceratophthalmoides* and *stigmatophthalmus.*

——— Beiträge zur Kenntnis devonischer Trilobiten.

1 Die Gattung Dechenella und einige verwandte Formen. Abhandl d. Senckenb. Natuf. Gesellsch, Bd. 31, 1913, 9 text figures, 4 plates.

The author divides the Dechenella into one new genus and three subgenera:

(A.) Basidechenella nov. subg.
(B). Eudechenella nov. subg.
(C.) Paradechenella nov. subg.
(D.) Dechenella.
(E.) Schizoproetus nov. gen.

Under the subgenus Basidechenella the author places:
Dechenella (Basidechenella) Kayseri Rud. Richter.
D. (B.) dombrowiensis Gürich, *D. (B.) onyx* nov.
Dechenella sp. Beushausen and D. sp.
Under the subgenus Eudechenella.
Dechenella (Eudechenella) Verneuili Barrande, syn. *Archegonus aequalis* Steininger, 1853, and *Phillipsia verticalis* Kayser, 1878.
Dechenella (Eudechenella) aff. *Verneuili* sp. A-B-C.
Dechenella (Eudechenella) Burmeisteri Rud. Richter syn. *Phillipsia verticalis* Kayser, 1878; *Tril. verticalis* Schlüter, 1880.
Dechenella verticalis Oehlert, 1885, Kayser, 1880, and Asselbergs, 1912, under *Dechenella Verneuili* Kayser, 1880, Oehlert, 1885, Schmidt, 1905.
Dechenella (Eudechenella) granulata n. sp.
Dechenella (Eudechenella) rittergensis Zimmermann, 1892.
Dechenella (Eudechenella) setosa Whidborne, 1889.
Dechenella (Eudechenella) Romanowski Tschernyschew, 1887.
Dechenella (Eudechenella) Polonica Gürich, 1896.
C. Under the subgenus Paradechenella the author describes:
Dechenella (Paradechenella) Tschernyschewi Rud. Richter, 1909.
Dechella hofensis Leyh., 1897.
Dechenella waigatschensis Tschernyschew and Yakovlew, 1898.
Dechenella disjecta n. sp.
Dechenella dubia n. sp.
Phillipsia (Dechenella) cfr. *setosa* (Whidborne) *Gortani.*
Dechenella incerta Oehlert, 1889.

Proetidarum genus *uralicum* (Rud. Richter) the *Dechenella Haldemanni* Tschernyschew (non Hall), 1887.

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RICHTER (Rudolf)—Continued

Under the new genus Schizoproetus the author places:

Schizoproetus celechovicensis (Smycka), 1895.

The work also includes notes on *Proetus unguloides* Barr. and *Phillipsia raclawicensis* Jarosz. The first referred by Gortani, 1907, to Dechenella, and the second by its author to that genus.

——— Beiträge zur Kenntnis devonischer Trilobiten.

Abbhandl der Senckenbergischen Nat. Ges. Bd. 31, 1913, pp. 346-423, plates 22 and 23.

The author describes and illustrates under (A.) Drevermannia n. genus, *D. Schmidti* n. sp., *D. brecciae* n. sp., *D. adorfensis* n. sp., *D. nodannulata* n. sp., *D.* n. sp., a, b, *D. globigenata* n. sp., *D. carnica* n. sp., *D. ? formosa* nov.

Under (B) Cyrtosymbole, new genus, the following species:

Cyrtosymbole Escoti Koenen, 1886; described under the genus Dechenella by Koenen Frech in 1887.

Cyrtosymbole n. sp., *C. nana* n. sp., *C. calymmene* n. sp., *C. bergica* n. sp., *C. wildungensis* n. sp., *C. Ussheri* Ivor Thomas *(Dechenella Ussheri* Thomas, 1909).

Cyrtosymbole dillensis (described by Drevermann, 1901, under Proetus), *C. pusilla* (described by Gürich, 1896, under Dechenella), *C. elegans* (described by Münster, 1842, under the genus Otarion), *C. Vinassai* (described by Gortani, 1907, under Dechenella), Cyrtosymbole sp., *C. italica Gortani.*

Under (C) Typhloproetus Frech nomen MSS.: *T. microdiscus* Frech mscr., 1909.

Under (D) Pteroparia n. gen., *P. columbella* n. sp.

Under (E) Proetus (Euproetus) nov. subgen. *Euproetus bivallatus* n. sp. and *E. glacensis* n. sp.

Under (F) Proetidae (subg.): *P. subcarintiacus* n. sp., *P. carintiacus* Drevermann, *P.* ex. aff. *carintiacus* Drevermann, *P. pusillus* Münster, (described under Asaphus Münster, 1840), *P. ebersdorfensis* n. sp., *P. Gortanii* n. sp., *P. palensis* n. sp., *P. Gümbeli* (The *Asaphus Cawdori* Münster, 1840), *P. anglicus* n. sp., *P. eurycraspedon* n. sp., *P. marginatus (Calymmene marginata* Münster, 1842).

Under (G) *Euproetus macrophthalmus (Cylindraspis macrophthalmus* Sandberger, 1850-56.):

Proetus (subg.) *furcatus (Calymmene furcata* Münster, 1842).

Proetus (Calymmene) furcatus Richter, 1856, non Münster.

Proetus Münsteri (Calymmene marginata Richter and Unger, 1856).

Proetus Münsteri (Calymmene marginata Münster, Richter, 1869).

Proetus (Otarion) elegans Richter, 1869: *P. tenellus* Richter, 1869, Proetus (subg.) n. sp. a-c.

Trilobites Münsteri Gümbel, 1879. *(Agnostus pisiformis* Münster, 1840).

Proetus sp. indet. Tietze, 1870; *Proetus* cfr. *Phocion* Billings Gortani, Proetus sp. indet. Gortani, Proetus f. ind. Rzehak. *Proetus aekensis* Born, 1912, *P.* sp. Born.

——— Neue Beobachtungen über den Bau der Trilobitengattung Harpes.

Geol. Anzeiger, Ba. 45, No. 4, 1914.

Harpes macrocephalus Goldfuss.

Ritter (R.) 1—Aus dem thüringischen Schiefergebirge.

Zeitsch. Deutsch. Geol. Ges., vol. 15, Heft 4, 1863, pp. 659-676, plates 18-19.

Harpes radians n. sp. *Proetus dormitans* n. sp., *P.* sp. *Phyllaspis raniceps* n. gen. et sp. *Arethusina* sp. *Phacops strabo* n. sp., *P. pyrifrons* n. sp., *P. Roemeri* Geinitz,

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RITTER (R.)—Continued

P. liopygus n. sp. *Acidaspis myops* n. sp. *Beyrichia (Leperditia) armata* n. sp., *B. Klöedni* McCoy, *B. subcylindrica* nov.

Corrections for reference on page 184, Bibliography Palæozoic Crustacea.

——— Der Kulm in Thuringen.

Zeitsch. Deutsch. Geol. Ges., 1864, p. 155.

Proetus posthumus n. sp. *Cythere spinosa* n. sp.

——— Untersilurische Petrefakten aus Thuringen.

Zeitsch. Deutsch. Geol. Ges., 1872, p. 72.

Calymmene sp. *Asaphus marginatus* n. sp. *Beyrichia excavata* n. sp.

Roberts (George L.) On some Crustacean Tracks from the Old Red Sandstone near Ludlow.

Quart. Jour. Geol. Soc., vol. 19, 1863, pp. 233-235.

——— and **Randall** (John). On the Upper Silurian Passage beds at Linley, Salop.

Quart. Jour. Geol. Soc., vol. 19, 1863, pp. 229-232.

Roemer (F.) Geoghostische Beobachtungen im polnischen Mettlelgebirge.

Zeitschr. d. Deutsch Geol. Ges., Bd. xviii, 1866.

Phacops cryptophthalmus Emm. Roemer's pl. xiii, figs. 6-7, has been described by Prof. Frech as *Phacops (Trimerocephalus) anophthalmus* n. sp. Lethaea Palæozoica, Bd. 2, pp. 124, 178, 179, 180.

——— *Eurypterus lacustris* von Buffalo, New York.

55 Jahrester der schles Ges., 1877.

Rogers (Austin F.) Some new American species of Cycles from the Coal Measures.

Contributions Geol. Dept. Columbia Univ., No. 88, vol. X, 1902.

Kansas Univ. Bull., vol. 1, 1902, pp. 269-275, plate 14.

Cyclus communis n. sp., *C. Packardi* n. sp., *C. permarginatus* n. sp., *C. limbatus* n. sp., *C. minutus* n. sp.

Rouault (Marie). Notice sur quelques especes de fossiles du Terrain Devonien du nord du Dept. de la Manche.

Bull. Soc. Geol. France, vol. 12, 1855, p. 1040.

Homalonotus Forbesi n. sp.

Add to the reference on p. 190, Bib. Pal. Crust., under Mem. Palæozoques des environs de Renness, 1851, the following species: *Cyphaspis Gaultieri* n. sp. *Phacops Michelini* n. sp. and *Beyrichia Hardouinina* n. sp.

Rowley (R. R.) Descriptions of Fossils.

Contributions to Indiana Palæontology, Green, New Albany, vol. 2, part 2, pp. 21-31, plate, 1906.

Gives systematic descriptions of various species of Trilobites and Crinoids.

——— The Geology of Pike County.

Missouri Bureau of Geol. and Mines, vol. 8, 2nd series, 1907, 122 pp., 20 plates and map.

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ROWLEY (R. R.)—Continued

The author notes and illustrates the following Ordovician Trilobites:

Illaenus taurus Hall. *Asaphus gigas* DeKay, *A. megistos* Locke. *Lichas trentonensis* Conrad, Illaenus sp.

Carboniferous Crustaceans Phillipsia *Strantton Porteri* n. sp., *P. Missouriensis* Shumard.

Ruedemann (Rudolf). Trenton conglomerate of Rysedorph Hill. Rensselaer County, New York, and its fauna.

Bull. N. Y. Museum, No. 49, 1901, pp. 3-114, plates 1-7.

Tretaspis reticulatus n. sp., *T. diademata* n. sp.

These species are specially characterized by the presence of the glabellar pits, the apical tubercle on the glabella and the ocular tubercles, the eye lines, the deep dorsal furrow, and the structure and profile of the marginal border. *T. seticornis* His. is the typical form.

Ampyx (Lonchodomas) hastatus n. sp. *Remopleurides tumidus* n. sp., *R. (Caphyra) linguatus* n. sp. *Isotelus maximus* Locke. *Gerasaphes Ulrichana* Clarke. *Illaenus Americanus* Bill. *Thaleops ovata* Conrad. *Cyphaspis matutina* n. sp., *C. hudsonica* n sp. *Bronteus lunatus* Bill. *Cybele* sp. *Calymmene senaria* Conrad. *Ceraurus pleurexanthemus* Green. *Sphaerocoryphe major* n. sp. *Dalmanites achates* Bill. *Pterygometopus eboraceus* Clarke, *P. callicephalus* Hall.

Ostracoda: *Leperditia fabulites* Conrad, *L. resplendens* n. sp. *Isochilina armata* Walc. var. *pygmaea* n. var. *Aparchites minutissimus* Hall var. *robustus* n. var. *Schmidtella crassimarginata* Ulrich var. *ventrilabiata* n. var. *Eurychillina reticulata* Ulrich, *E. bulbifera* n. sp., *E. ? solida* n. sp., *E. subradiata* Ulrich var. *rensselaerica* nov., *E. dianthus* nov., *E. ? anthus* n. sp., *E. obliqua* n. sp., *Primitia mundula* Miller var. *Jonesi* n. var. *Bollia cornucopiae* n. sp. *Macronotella Ulrichi* n. sp., *M. fragaria* n. sp. *Bythocrypris cylindrica* Hall. *Lepidocoleus Jamesi* H. & W.

——— The Lower Siluric shales of the Mohawk Valley.

N. Y. State Museum Bull., 162, 1912.

The author illustrates *Eoharpes ottawansis* Billings.

Proetus undulostriatus Hall.

This is the *Olenus undulostriatus* Hall describes in Pal. N. Y., 1847, p. 258, pl. 67, fig. 3 a-b. The author doubtfully refers *Proetus parviusculus* Hall, of the 13th Report N. Y. State Mus., 1860, p. 120, and the *Proetus parviusculus* Ruedemann, Bull. 42, 1901, p. 536, and *Cyphaspis hudsonica* Ruedemann, Bull. 49, 1901, p. 64, pl. 4, figs. 8 and 9, to this species.

Acidaspis crossota Locke. *Calymmene senaria* Conrad. *Isotelus gigas* DeKay.

Ostracoda: *Ulrichia bivertex* Ulrich. *Eurychilina subradiata* Ulrich. *Primitiella unicornis* Ulrich var. *Ceratopsis chambersi* Miller var. *Technophorus cancellatus* nov. *Pollicipes siluricus* Ruedemann, a barnacle from Snake Hill beds of Green Island, New York.

——— Palæontologia Universalis, Fac. 1, Ser. IV. Dr. Jacob Green's original of description North American Trilobites.

Calymene callicephala, original specimen N. Y. State Museum, pl. 233.

Calymene platys, original specimen N. Y. State Museum, pl. 234.

Asaphus micrurus, original specimen N. Y. State Museum, pl. 235.

Ceraurus pleurexanthemus, original specimen N. Y. State Museum, pl. 236.

The author quotes Dr. Green's monograph Trilobites of North America, published Oct. 1, 1832, for original description of the species illustrated. This is an error. The Synopsis of the Trilobites of North America, issued in June, 1832, in The Monthly

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RUEDEMANN (Rudolf)—Continued

American Journal of Geology and Natural Science, pp. 558-560, plate 14, was the original publication in which Dr. Green figures *Asaphus micrurus*, fig. 3, and *Ceraurus pleurexanthemus*, fig. 10.

——— Account of some new or little known species of fossils, mostly from Palæozoic rocks of New York.

Bull. New York State Mus., No. 189, 1916.

The author describes the following Crustacea:

Agnostus Cushingi nov.

It differs from *A. Newtonensis* Weller and its congeners in the broad, anteriorly well-rounded convex cranidium and obscure glabella.

Amphilichas conifrons nov.

This species differs from *A. Trentonensis* Hall, in the entirely different outline of the middle lobe of the glabella, which in the former is widest behind and in the new species broadens forward.

Ceratiocaris (Liminocaris) salina nov.

Spathiocaris Emersoni Clarke.

These specimens differ markedly from the strange valves figured with *S. Emersoni* on plate 34, fig. 13, Pal. N. Y., vol. 7, which latter possesses a much broadened flat posterior fold and a very shallow anterior notch. The author makes a new species of this form, referring it to *Pholadocaris Lutheri*.

Spathiocaris lata nov., *S. chargrinensis* nov., *S. Cushingi* nov., *S. Williamsi* nov. This is of larger size than the congenors and is readily distinguished by its broad form and coarse lines.

On p. 98 the author gives a discussion on the genera Spathiocaris and the Discinocarina and certain organic bodies called Cardiocaris, Pholadocars, etc., by Woodward and Clarke, considered as Crustaceans by other authors (Roemer, DeVerneuil, Kayser and Dames) as aptychi of Goniatites.

Lepidocoleidae. *Anatifopsis Wardelli* nov.

Pseudoniscus.

The eyes of this genus have for some time been an object of speculation. Nieszkowski, pl. 2, fig. 15, who first described a Pseudoniscus, figured a small incision along the edge of the fixed cheek as place for the eye; Eichwald Lethaea Ross, p. 1445, speaks there of large lunular eyes, and Woodward, Mong. of the Merostoma, p. 177, fig. 65, restored the cephalon completely with eyes.

The author describes. *Pseudoniscus Roosevelti* Clarke and *P. Clarkei* nov., a Bertie Waterline species.

Echinognathus Clevelandi Walcott. *Eusarcus trigonus* nov.

Article II. Notes of the habitat of the Eurypterids.

Article IV. A new Ceraurus from the Chazy, by Percy E. Raymond. *Ceraurus Reudemanni* nov.

Article V. The presence of a median eye in Trilobites.

Gives figures in text of *Isotelus gigas* and *Basilicus tryannus*. It is claimed in this paper that most, if not all, Trilobites possessed a median or parietal eye on the glabella. A great number of species, belonging to more than 30 genera, possess a distinct tubercle on the glabella. This tubercle occurs alone in many genera otherwise smooth, as in Asaphidae and is hence of functional importance. The author gives a list of the species with median eye tubercles.

Article VI. The cephalic suture lines of Cryptolithus.

The author gives figures in the text of *Dionide formosa* Barr., *D. atra* Salter and *Cryptolithus tesselatus* Green. The author concludes that these genera are not Hypo-

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RUEDEMANN (Rudolf)—Continued

peria, but belong among the families of Opisthoparia. The figure of *Cryptolithus tesselatus* shows the lateral facial suture and the lateral eye tubercle, also median eye tubercle.

Plate 36 contains a few figures of various genera of Trilobites with median eye tubercle, such as:

Isoteloides homalonotoides Walc. *Symphysurus convexus* Cleland. *Basilicus Kegelensis* Sch. *Symphysurus angustatus* S. & B. *Asaphellus monticola* Raym. *Asaphus ludibundus* mut. *jewensis* Schm. *Hemigyraspis collieana* Raym. *Nileus Armadillo* Dalm. *Ceratopyge forficula* Sars. *Niobe insignis* Linrs. *Barrandia crassa* Barr. *Æglina umbonata Illaenus oriens* M. & S. *Bronteus Haidingeri* Barr.

——— and **Clarke** (John M.) Catalogue of the type specimens of Palæozoic Fossils in New York State Museum.

Bull. New York State Museum, No. 65, 1903.

Crustacea, pp. 658-765 and 814.

Classification of the type specimens by geologic formations, pp. 815-847.

Sarle (Clifton J.) A new Eurypterid fauna from the base of the Salina of Western New York.

Bull. New York State Mus., No. 69, 1903, pp. 1087-1108, pls. 6-26.

The author proposed a new genus Hughmilleria for a small form, which from its general appearance in many ways suggests the genus Eurypterus, but a study of its structure shows it to be closely related to Pterygotus.

The author described *Hughmilleria socialis* nov. and var. *robusta* nov. var. A new species of Eurypterus is included under the name of *E. pittsfordensis*, which closely resembles *E. lacustris*, approximately of the same size, also in the position and shape of the eyes. The posterior portion of the cephalon flares out in *E. pittsfordensis*, or at least broadens out in a hyperbolic curve, while *E. lacustris* is marked by the nearly parallel sides of the cephalon.

The author also describes *Pterygotus monroensis* nov.

Savage (T. E.) Stratigraphy and Palæontology of the Alexanderian series in Missouri and Illinois, part one.

Bull. No. 23, State Geol. Sur. Illinois, 1913, 124 pp., with 7 plates.

The author describes *Proetus princeps* n. sp. This rare specimen from the Thebes, Illinois, has a glabella resembling that of *P. determinatus* Foerste, and differs but slightly from the Edgewood species. From the Girardeau limestone, Shumard, Geol. Mo., 1855, p. 198, gives the name of *Proetus depressus* to a species without figure or description. This is not the *P. depressus* Weller, Pal. N. J., vol. 3, p. 249.

The author also describes *Cyphaspis girardeauensis* Shumard. *Acidaspis Halli* Shumard. *Encrinurus deltoideus* Shumard and *Calymmene dubia* n. sp., which resembles *Calymmene platycephala* Foerste.

From the Edgewood series of Illinois the author describes:

Proetus determinatus Foerste, described as Bathyurus Foerste in the Bull. Lab. Den. Univ. vol. 1, p. 103, pl. 14, fig. 5, 1885.

Cyphaspis intermedia Weller, and *Metapolichas breviceps* var. *clintonensis* Foerste.

Dalmanites Danai Meek and Worthen.

The species resembles *D. limulurus* Green, but somewhat larger.

From Channahon, Illinois, the author describes *Proetus channahonensis* Weller. It has a more prominent glabella and deeper glabella furrows than *P. determinatus* Foerste.

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SAVAGE, T. E.—Continued

Cyphaspis intermedia Weller, [illegible] Weller, and a new species of Ostracoda, *Leperditia* [illegible]—shell differing from *Leperditia faba*, in being shorter and more nearly circular in outline.

——— Some interesting new species of Arthropods from the Devonian strata of Illinois.

Am. Jour. of Science, vol. 35, 1913, p. [illegible] figures.

The author describes *Lepidocoleus* [illegible] n. sp. a barnacle from the Clear Creek of Union County Oriskany chert and a new [illegible] *Dalmanites palaceus*. This shovel form closely resembles *D. tridentiferus* Shumard, but the anterior extension is short and concave with margin entire instead of having that extension prolonged into a three-lobed process.

——— Alexandrian Rocks of Northeastern Illinois and Eastern Wisconsin.

Bull. Geol. Soc. Am., vol. 27, 1916, pp. 305-344, pls. [illegible].

Eurypterus pumilus nov.

Schlüter (Clemens). Neuere Arbeiten über die ältesten Devon Ablagerungen des Hartz.

Verdhandl, des Naturhist, Verenins der preuss. Rhein[illegible] Westfalens, vol. 35, Jahrg. 4, Folge V, Bd. p. 330.

Gives a list of Fossil Crustacae.

Schmidt (Friedrich). Physikalische Section.

Sitzungsb. d. niederrhein Gesellschaft, in Bonn, 1881.

The author describes *Cryphaeus limbatus*, p. 77, and [illegible] nov., p. 144, and *C. rotundifrons* Emm.

Richter refers the last two species to *Cryphaeus* [illegible] from the Eurypterus beds of Oesel, and compared them with those of North America.

——— Ueber die neue Merostomenform [illegible] aus dem Obersilur von Rootzküll auf Oesel.

Bull. Acad. Imp. Sci. de St. Petersb. ser. 5, vol. [illegible], No. [illegible], p. [illegible]

——— Revision der Ostbaltischen Silurischen Trilobiten. Abtheilung V, Asaphiden Lieferung 1.

Mem. Acad. St. Petersburg, 8th ser., vol. 6, No. [illegible], [illegible].

Gen. Asaphus Brong. emend. Ang.

[illegible] Dalm. and var. [illegible] Nieszk., [illegible] Dalm., *A. Broggeri* [illegible] n. sp., [illegible] Ang., *A.* [illegible] Lawr., *A. Eich-*[illegible] Pander, [illegible] Pander, *A. delphinus* Lawr., [illegible] Eichw., [illegible] n. sp. Mut. *Itferensis* Mut. [illegible] n. sp.

[illegible]

[illegible]

[illegible]

[illegible] Ang. and var. [illegible] Nieszk., [illegible] n. sp., [illegible] Eichw., *P.* [illegible]

[illegible]

[illegible] Sem., [illegible] Rom.

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SCHMIDT (Friedrich)—Continued

Gen. Niobe Angelin.

Niobe laeviceps Dalm., *N. frontalis* Dalm.

Megalaspis planilimbata Ang., *M. limbata* Boeck, *M. polyphemus* Brogg., *M. Kolenkoi* n. sp., *M. Mickwitzi* n. sp., *M. hyorhina* Herz. v. Leucht., *M. gibba* n. sp., *M. Lawrowi* n. sp., *M. longicauda* Herz. v., Leucht. (mit *M. gigas* Ang.), *Meglaspis extenuta* Wahlb., *M. acticauda* Ang., *M. heros* Dalm.

Gen. Nileus Dalman.

Nileus Armadillo Dalm.

——— Revision der Obstbaltischen Silurischen Trilobiten. Abtheilung V. Asaphiden Lieferung II.

Mem. Acad. St. Petersburg, 8th ser., vol. 12, No. 8, 1901, 12 plates.

Asaphus Broggeri n. sp., *A. expansus* Dalm., *A. lepidurus* Nieszk., *A. raniceps* Dalm. var. *Lamanskii* and var. *acuminata* Boeck.

Asaphus pachyopthalmus n. sp. var. *minor* and var. *major*, *A. Eichwaldi* n. sp. var. *Knyrkoi*, *A. delphinus* Lawr., *A. cornutus* Pand. and var. *Holmi*, *A. Kowalewskii* Lawr., *A. platyurus* Ang., *A. laevissimus* n. sp. and var. *laticauda*, *A. latus* Pand. and var. *Plautini*, *A. devexus* Eichw., *A. ornatus* Pomp., *A. ludibundus* Torq. mut. *Itferensis* mut. *jewensis* mut. *Kegelensis*.

Onchometopus Volborthi n. sp.

Gen. Isotelus Dekay.

Isotelus remigium Eichw., *I. platyrhachis* Steinh., *I. robustus* F. Rom., *I. Stacyi* n. sp.

Gen. Niobe Angelin.

Niobe laeviceps Dalm., *N. Lindstromi* n. sp., *N. frontalis* Dalm.

——— Communication before the Section of Geology and Mineralogy, Oct. 19, 1902, announcing the discovery of *Eurypterus simonsoni*.

Comptes rendus des Sci. in Travaux de la Soc. Imp. de Nat. de St. Petersburg, vol. 33, livr. 1, No. 6, 1902, pp 202-3, in Russian.

——— Ueber die neue Merostomenform *Stylonorus simonsoni* aus dem Odersilur von Rootzküll auf Oese.

Bull. Acad. Imp. de Sci. St. Petersburg, vol. 20, No. 3, ser. V, 1904, pp. 99-105, plate.

——— Revision der Ostbaltischen Silurischen Trilobiten. Abtheilung V, Asaphiden Lieferung III.

Mem. Acad. St. Petersburg, 8th. ser., vol. 14, No. 10, 1904, 8 plates.

Gen. Ptychopyge Angelin.

Subgen. Pseudasaphus.

Pseudasaphus globifrons Eichw., *P.? Mickwitzi* n. sp., *P. tecticaudatus* Steinh. and var. *praecurrens*.

Subgen. Basilicus Salter.

Basilicus Lawrowi n. sp., *B. kuckersianus* n. sp., *B. keyelensis n.* sp.

Subgen. Ptychopyge sens. str.

Ptychopyge angustifrons Dalm. and var. *gladiifera*, *P. truncata* Nieszk. and var. *Broggeri*, *P. cincta* Brogg., *P. Plautini* n. sp., *P. Wohrmanni* n. sp., *P. Knyrkoi* n. sp., *P. Pahleni* nov.

Gen. Ogygia Brongniart auct.

Ogygia dilatata Brunn var. *Panderi* n. var. and var. *Plautini*.

Gen. Nileus Dalman.

Nileus Armadillo Dalm.

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SCHMIDT (Friedrich)—Continued

——— Revision der Ostbaltischen Silurischen Trilobiten. Abtheilung V, Asaphiden Lieferung IV.

Mem. Acad. St. Petersburg, 8th ser., vol. 19, No. 10, 1906, 8 plates.

Megalaspis planilimbata Ang. and var. *Leuchtenbergi* Lam., *M. limbata* Boeck and var. *elongata, M. Lawae* n. sp., *M. polyphemus* Brögg. aff. and var. *Tornquisti* var. *minor* var. *Lamanskii* and var. *Knyrkoi, M. hyorhina* Leucht. also var. *Kolenkoi, Mickwitzi* and *Stacyi.*

Megalaspis Pogrébowi Lam., *M. Knyrkoi* n. sp., *M. gibba* n. sp., *M. acuticauda* n. sp. also var. *typica, obtusa, triangularis* and *Lamanskii.*

Megalaspis extenuata Dalm., *M. heros* Dalm., *M. centaurus* Dalm. and var. *rudis, M. Lawrowi* n. sp.

——— Revision der Ostbaltischen Silurischen Trilobiten.

Memoiries Acad. Imp. des Science de St. Petersburg, vol. xx, No. 8, 1907.

Phacops elliptifrons Esm., *P. Downingiae.* Murch. *Pterygometopus.*

Phacops sclerops Dalm., *P. trigonocephala* F. S., *P. Panderi* F. S., *P. exilis* Eichw., *P. laevigata* F. S., *P. Kuckersina* F. S., *Kegelensis* F. S., *P. Nieszkowskii* F. S.

Subgenus Chasmops. *Phacops ingrica* F. S., *P. nasuta* F. S., *P. praecurrens* F. S., *P. Odeni* Eichw., *P. Odini* var. *itferensis* F. S., *P. marginata* F. S., *P. bucculenta* Sjogr., *P. Wrangeli* F. S., *P. brevispina* F. S., *P. mutica* F. S., *P. Wenjukowi* F. S., *P. maxima* F. S., *P. Wesenbergensis* F. S., *P. Eichwaldi* F. S.

Cheirurus ornatus Dalm., *C. ingricus* F. S., *C. exsul* Beyr., *C. macrophthalmus* Kut., *C. gladiator* Eichw., *C. spinulosus* Nieszk., *C.* cf. *glaber* Ang.

Subgenus Crytometopus. *Cheirurus primigenus* var. *Lamanskii* Ang., *C. clavifrons* Dalm., *C. affins* Ang., *C. Plautini* F. S., *C. aries* Eichw., *C. Pseudohemicranium.*

Subgenus *Sphaerexocoryphe cranium* Kut., *S. Hubneri* F. S., *S.* cf. *granulata* Ang.

Subgenus *Pseudosphaerexochus hemicranium* Kut., *P. conformis* Ang., *P. Pahnschi* F. S., *P. Roemeri* F. S.

Subgenus *Nieszkowskia tumida* Ang., *N. variolaris* Linrs., *N. cephaloceros* Nieszk.

Sphaerexochus angustifrons Ang. *Deiphon Forbesi* Barr.

Amphion Fischeri Eichw., *Diaphanometopus Volborthi* F. S.

Crotalurus Barrandei Volb.

Cybele bellatula Dalm., also var. *Wohrmanni* F. S., *C. Panderi* F. S., *C. Revaliensis* F. S., *C. rex* Nieszk., *C. Grewingkii* F. S., *C. coronata* F. S., *C. Worthi* Eichw., *C. affinis* F. S., *C. Kutorgae* F. S., *C. brevicauda* Ang.

Encrinurus obtusus cf. Ang., *E. punctatus* Wahlb., *E. multisegmatatus* Portl., *E. Sechachi* F. S.

Acidaspis Marklini Ang., *A. Kuckersiana* F. S. and var. *Mickwitzi* F. S. *Lichidae* subgen. Arges *Lichas wesenbergensis* F. S.

Subgen. Leiolichas. *Lichas illaenoides* Neiszk.

Subgen. Platymetopus. *Lichas lineatus* Ang., *L. dalecarlicus* Ang., *L. Holmi* F. S.

Subgen. Metopias. *Lichas celorhin* Ang., *L. verrucosus* Eichw., *L. pachyrhinus* Dalm., *L.* var. *longerostrata* F. S., *L. platyrhinus* F. S., *L. Hübneri* Eichw., *L. Kuckersianus* F. S.

Subgen. Hoplolichas. *Lichas tricuspidatus* Beyr. and var. *longispina L. Plautini* F. S., *L. furcifer* F. S., *L. conicotuberculatus* Nieszk.

Subgen. Conolochas. *Lichas triconicus* Dam., *L. aequilobus* Steinh., *L. schmidtii* Dam.

Subgen. Ceratolichas. *Lichas inexpectatus* F. S.

Subgen. Homolichas. *Lichas depressus* Ang., *L. Pahleni* F. S., *L. deflexus* Sjogr., *L. Eichwaldi* Nieszk., *L. angustus* Beyr.

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SCHMIDT (Friedrich)—Continued

Subgen. Oncholichas. *Lichas ornatus* Ang., *L. gotlandicus* Ang.

Subgen. Platylichas. *Lichas St. Mathiae, L. margaritifer* Nieszk., *L. docens* F. S., *L. cicatricosus* Lov., *L. hamatus* F. S., *L. laxatus* McCoy.

Illanus Esmarcki Schl., *I. sphaericus* Holm., *I. jewensis* Holm., *I. laticlavius* Eichw., *I. chiron* Holm., *I. intermedius* Holm., *I. crassicauda* Waldh., *I. tauricornis* Kut., *I. ariensis* Holm., *I. sulcifrons* Holm., *I. Plautini* Holm., *I. revaliensis* Holm., *I. Dalmani* Volb., *I. oculosus* Holm., *I. chudleighensis* Holm., *I. sinuatus* Holm., *I. Schmidtii* Nieszk., *I. ladogensis* Holm., *I. oblongatus* Ang., *I. Roemeri* Volb., *I. angustifrons* Holm., *I. atavus* Eichw., *I. Masckei* Holm., *I. centrotus* Dalm., *I. Linnarssoni* Holm., *I. proles* Holm., *I. livonicus* Holm., *I. triquetrus* Volb., *I. caecus* Holm.

Subgen. Bumastus. *Illaenus barriensis* Murch., *I. sulcatus* Lindstr.

Calymmendiae: *Calymmene tuberculata* Brunn., *C. intermedia* Linstr., *C. frontosa* Lindstr., *C. laevigata* F. S., *C. conspicua* F. S., *C. spectabilus* Ang., *C. Stacyi* F. S.

Subgen. Pharostoma. *Calymmene pedibola* F. Rom., *C. Nieszkowskii* F. S., *C. denticulata* Eichw.

Subgen. Ptychometopus. *Calymmene Volborthi* F. S.

Bronteidae: *Bronteus laticauda* Wahl., *B. estonicus* F. S., *B. Marklini* Ang.

Proetidae: *Proetus concinnus* var. *Osiliensis* F. S., *P. verrucosus* Lindstr., *P. conspersus* Ang., *P. planedorsatus* F. S., *P.* cf. *distans* Lindstr., *P. ramisulcatus* Nieszk., *P. Kertelensis* F. S., *P. Wesenbergensis* F. S., *P. Wöhrmanni* F. S.

Cyphaspis elegantula Lov., *C. planifrons* Eichw.

Menocephalus minutus Nieszk.

Harpedidae: *Harpides Plautini* F. S.

Harpes Spasskii Eichw., *H. Wegelini* Ang.

Trinucleus seticornis His.

Ampyx Volborthi F. S., *A. Linnarssoni* F. S., *A. costatus* Sars ? *A. rostrata* Sars, *A. Kuyrkoi* F. S., *A. dubius* F. S.

Remopleurides nanus Leucht., *R.* var. *elongata* F. S., *R. emarginatus* Törnq.

Dikellocephalidae: *Apatocephalus serratus* Sars and Boeck; also var. *dubius* Mob.

Agnostus glabratus var. *ingrica* F. S.

Asaphus Broggeri F. S., *A. expansus* Dalm., *A. lepidurus* Nieszk., *A. raniceps* Dalm., *A. pachyophthalmus* F. S., *A. Eickwaldi* F. S., *A. delphinus* Lawr., *A. cornutus* Pander, *A.* var. *Holmi* F. S., *A. Kowalewskii* Lawr., *A. platyurus* Ang., *A. laevissimus* F. S.; also var. *laticauda* F. S., *A. latus* Pander and var. *Plautini* F. S., *A. devexus* Eichw., *A. ornatus* Pomp., *A. lepidus* Törnq. *Nieszkowskii* F. S. and var. *jewensis* F. S., *A. Kegelensis* F. S.

Onchometpus Volborthi F. S.

Isotelus remigium Eichw., *I. platyrhachis* Stein, *I. robustus* F. Rom., *I. Stacyi* F. S.

Niobe laeviceps Dalm., *N. Lindstromi* F. S., *frontalis* Dalm., *N. Volborthi* F. S.

Ptychopyge Ang. subgen. Pseudasaphus F. S., *P. globifrons* Eichw., *P. tecticaudatus* Steinh.

Subgen. Basilius Salt., *B. Lawrowi* F. S., *B. Kuckersianus* F. S., *B. Kegelensis* F. S.

Ptychopyge angustifrons Dalm., *P.* var. *gladiifera* F. S., *P. truncata* Nieszk. and var. *Broggeri, P. cincta* Brogg., *P. Plautini* F. S., *P. limbata* Ang., *P. Knyrkoi* F. S., *P. Pahleni* F. S.

Ogygia dilatata var. *Panderi* F. S., *P. dilatata* var. *Plautini* F. S.

Nileus Armadillo Dalm.

Megalaspis planilimbata Ang., *M. limbata* Boeck, *M. Lawae* F. S., *M. polyphemus* Br. aff. and var. *minor* F. S., *M. Lamanskii* F. S., *M. Knyrkoi* F. S., *M. hyorhinus* Leucht and var. *Kolenkoi* F. S., *M. Mickwitzi* F. S., *M. Stacyi* F. S., *M. Pogrebowi* F. S., *M. Knyrkoi* F. S., *M. gibba* F. S., *M. acuticauda* Ang., *M. extenuata* Dalm., *M. heros* Dalm., *M. centaurus* Dalm. and var. *rudis* Ang., *M. Lawrowi* F. S.

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SCHMIDT (Friedrich)—Continued

Megalaspides Schmidtii Lam.
Olenellus Mickwitzi F. S.
Cheirurus (Cyrtometopus) primigenus Ang., *Cybele bellatula* var. *Wohrmanni.*
Lichas Pahleni F. S., *L. cicatricosus* Loven, *Niobe Volborthi* F. S.
Cyrtometopus Pseudohemicranium Nieszk. *Encrinurus Seebachi* F. S.
Calymmene frontosa Lindstr., *C. laevigata* and *conspicua* F. S.
Asaphus lepidus Törnq. and *A. Nieszkowski* F. S. *Niobe laeviceps* Dalm.
Megalaspis hyorhina Leucht.

Schmidt (W. E.) Cryphaeus in dem Siegener Schichten.

Zeitschr. d. Deutsch. Geol. Ges., vol. 59, 1907.

The author describes as *Cryphaeus attavus* a species with a head and a short, triangular pygidium, which shows a faint development of four pairs of marginal lappets, seen best by the four pairs of pits within the doublure.

Dr. Clarke in his paper on Devonic of Parana, p. 156, remarks: This, certainly, is not a Cryphaeus, even phylogenetically, for exceedingly young forms of Cryphaeus have sufficiently demonstrated that the ontogeny presents no four-spined stage. The tail is similar in the character of its lappets to those obscure structures in *Proboloides pessulus,* a new genus created by Clarke in the same work.

Schumacher (R.) Ueber Trilobitenreste aus dem Unterkarbon im Ostlichen Teil des Rosbergmassivs in den Südvogesen.

Zeitschr. Deutsch. Geol., Ges. 55, 1903, pp. 432-438, plate 19.
Phillipsia Silesiaca Scupin, *P. Eichwaldi* var. *alsatica* n. var.
Griffithides Frechi Scupin, *G. Damesi* Scupin.

Schuchert (C.) On the Lower Silurian (Trenton) fauna of Baffin Land.

Proc. Natl. Museum, vol. 22, 1900, pp. 143-177, plates 12-14.
Dalmanites (Pterygometopus) Goodridgi n. sp. *Illaenus vigilans* H. & W., *I. crassicauda Americanus* Billings. *Isotelus gigas* DeKay. *Ceraurus pleurexanthus* Green.

Scupin (Hans). Die Trilobiten des niederschlesischen Untercarbon.

Zeitschr. Deutsch. Geol. Ges., Jahrg, 1900, pp. 1-20, plate, figs. 1-3, text.
Phillipsia aff. *aequalis* Meyer, *P. longicornis* Kays., *P. gemmulifera* Phill., *P. truncatula* Phill., *P. Silesica* n. sp., P. Spec.
Griffithides Damesi n. sp., *G. Frechi* n. sp., *G. depressus* n. sp., *G. claviger* n. sp.

Seemann (Fr.) Beiträge zur Gigantostraken fauna Böhmens.

Beitr. zur. Pal. and Geol. Österr-Ung. u. d. Orients, Bd. 19, Hft. 1, p. 49, 1906.

Semper (M.) Die Gigantostraken des älteren böhmischen Paläozoicum.

Beiträge zur Palæontologie and Geol. Oesterreich-Ungarns u. d. Orients, Bd. 11, 1898, p. 71.

Seward (A. C.) Notes on Fossil Plants from the Witteberg series of the Cape Colony.

Geol. Mag., Decade 5, vol. 6, No. 11, 1909, p. 482.

The author refers the *Hastimima Wheitei* to the genus Eurypterus, p. 485, as part of a body segment of that genus.

This paper is followed on p. 486 with a note on the genus Hastimima from Brazil and the Cape, by Henry Woodward, in which the author compares it with *Eurypterus punctatus* Salter.

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Shimer (H. W.) Almost complete specimen of *Strennella strenua* Billings.

Am. Jour. Science, vol. 23, 1907, pp. 199-201, figure.

In the Amer. Jour. Sci., vol. 23, 1907, p. 319, the author refers *Ptychoparia murronatus* Shaler and Foerste, Bull. Mus. Zool., vol. 16, plate 2, to *Strenuella strenua* Billings, remarking that it appears that *S. strenua* is quite variable in the shape of the free cheeks and in the ornamentation of the axis.

Shuler (E. W.) New Ordivician Eurypterid.

Am. Jour. Sci., vol. 39, 1915, p. 551.

Stylonurus (Ctenopterus) alveolatus p. 552, fig. in text 1-6, from the Bay sandstone, Walker's Mt., Virginia.

The subgeneric name of Ctenopterus was used on account of the long, flattened segments of the endognathite; the lack of serrations on the segments, such as is found in Eurypterus; the presence of the long joint, belonging probably to the walking leg or balancer characteristics of Stylonurus, and the long, broadened spines or bristles which are especially characteristic of the subgenus Ctenopterus.

Siegert (L.) Versteinerungs-führenden Sedimentgeschiebe im Glacialdiluvium des Nordwestlichen Sachsens.

Palæontologisches Institut der Univ. Leipzig, 1898, pp. 37-138.

Cambrian: *Eurycare latum* Ang. *Peltura scarabaeoides* Wahl. *Sphaerophthalmus alatus* Boeck.

Silurian: *Asaphus expansus* Dalm. *Cheirurus (Nieszkowskia) variolaris* Lin. *Remopleurides nanus* c. Leucht. *Agnostus glabratus* Ang. *Chasmops conicophthalmus* S. & B. *Beyrichia costata* Lin. *Chasmops macrourus* Sjogren, *C. Wesenbergensis* Schmidt.

***Siemiradski** (J. von). Die Paläozischen Gebilde Podoliens. (Not seen.)

11 Paläontologischer Teil Wien Beitr. Pal. Geol., Ost Ung. 19, 1906, pp. 213-286, Taf. xv-xxi.

Siemiradzki (von Jos.) Die palæozoischen Gebilde Podolens.

Beiträge Z. Pal. and Geol. österr-Ung. u. s. Orients, Bd. 19, Heft 2, vol. 3, 1906, p. 4.

Six (Achille). Les appendices des Trilobites d'aprés M. Ch. D. Walcott.

Soc. Geol. du Nord, Ann. xi, 1883-84, pp. 228-236.

Slocum (A. W.) On the Trilobites of the Maquoketa beds of Fayette County, Iowa.

Field Mus. Nat. Hist., No. 171, Geol. Ser., vol. 4, No. 3, pp. 43-83, plates 13-18, 1913.

The author has secured from these beds 20 species of Richmondian Trilobites, 17 of which are here named, 11 of them being new.

The new genus Cybeloides is also defined.

The author describes and illustrates the following Crustacae:

Isotelus gigas DeKay, *I. maximus* Locke, with the remark that most of the specimens of Isotelus from this locality, which have been referred by other authors to *I. maximus*, are here referred to *Isotelus Iowenis* Owen.

Isotelus Iowensis Owen. *Megalaspis Beckeri* sp. nov. Compares *M. gonioceras* Meek and *M. extenuata* Angelin.

Nileus vigilans Meek and Worthen. *Bumastus Beckeri* sp. nov. *Thaleops ovata* Conrad. *Amphilichas rhinoceros* sp. nov., *A. clermontensis* sp. nov.

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SLOCUM (A. W.)—Continued

Encrinurus pernodosus sp. nov.

Cybeloides gen. nov. This genus differs from Cybele Loven, as exhibited in *C. bellatula* the genotype, in the form of the glabella furrows, and in the genal angles being produced into spines, instead of being rounded.

The author describes *Cybeloides iowensis* sp. nov.

Calymmene fayttensis sp. nov., *C. gracilis* sp. nov. *Ceraurus pleurexanthemus* Green, *C. Milleranus* Miller and Gurley, *C. elginensis* sp. nov.

Eccoptochile meekanus S. A. Miller.

Sphaerocoryphe maquokensis sp. nov. *Pterygometopus Fredricki* sp. nov., *P. larrabeei* sp. nov.

Smith (J. F., Jr.) Canadian Journal, new series, vol. 6, 1861, p. 275.

Triarthrus canadensis nov.

The genal angles of the head are spined.

Smycka (F.) Beiträge zur Kenntniss der Trilobiten fauna in mahrischen Devon bei Celechovitz.

Acad. des Sci. de l'Empereur Francis Joseph, 1 Bull., Intern. class des Sci. Math. and Nat., pp. 19, plate 1, 1895.

The author gives a list of 60 species, which serves to indicate the Upper Devonian age of the fauna. He gives descriptions of several Trilobites, two of which are new, namely: *Proetus celechovincensis* n. sp. and *P. moravicus* sp. nov.

——— Ueber die Trilobiten des Celechovitzer Devon in Mahren.

Vesmir Prag., 1895, Jahrg. 24, p. 136.

Bronteus intermedius Goldf. *Dechenella Verneuili* Barr.

This species is referred by Richter to *Dechenella (Eudechenella) rittbergensis* Zimmermann.

Proetus Celechovicensis n. sp., *P. maravicus* n. sp. and *Cyphaspis* sp.

Sobolev (D.) Mittel Devon des Kielec-Sandonir Gebirges.

Mater Geol. Ross., St. Petersburg, vol. 24, 1909, pp. 41-536, with 5 plates.

Devonian Ostracoda.

Spencer (W. K.) The hypostomaic eyes of Trilobites.

Geol. Mag., Decade 4, vol. 10, 1903, pp. 489-492, with 3 figures.

This is a review of Dr. Lindstrom's paper, "Researches on the Visual Organs of the Trilobites," to show the close correspondence of the maculae with certain sense organs present in the Phyllopod genus Branchipus, and also in Limulus.

Spriestersbach and Fuchs. Die Fauna der Remscheider Schichten.

Abh. Geol. Landesant, N. F. Heft 58, 1909, pp. 111 and 81, with 11 plates.

Beyrichia embryoniformis n. sp., *B. montana* n. sp. *Entomis* sp. *Cryphaeus* sp. (Dr. Green's genus Cryphaeus, 1837.) This generic name was used in 1833 for a genus of Coleoptera, therefore will have to be abandoned.

Stauffer (Clinton R.) The Middle Devonian of Ohio.

Geol. Sur. Ohio, Fourth Series, Bull. No. 10, 1909.

The author describes as new *Proetus Welleri* from Venice, Ohio. The species was referred by Rud. Richter to *Dechenella* (aff. ? *Eudechenella Welleri).*

Stepanov (P.) Fauna aus der Umgebung des Balchas Sees.

Verh. Russ. Mineral. Ges., Ser. 2, vol. 46, 1908, pp. 161-198, plates 1 and 2.

Leperditia shearsbii Chapman.

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Steusloff (A.) Ostrakoden aus Diluvialgeschieben von Neu-Brandenburg.

Zeitschr. Deutsch. Geo. Ges., Jahrg., 1894, pp. 775-787, pl. 53.

Cambrian: *Bythocypris polita* n. sp.

Ordovician: *Primitia excelsa* n. sp., *P. reticulata* n. sp., *P. concinna* n. sp., *Beyrichia antiqua* n. sp., *B. digitata* var. *separata* n. var. *Entomis latisulcata* n. sp., *E. impressa* n. sp., *E. umbonata* n. sp.

Brandschiefer: *Strepula elliptica* n. sp. *Entomis sigma* Kr

Macroura Kalk: *Beyrichia Krausei* n. sp., *B. rostrata* Kr. *Entomis oblonga* n. sp.

Untersilurischer Beyrichien Kalk: *Primitia angulata* n. sp., *P. curva* n. sp. *Strepula lineata* var. *granulosa* n. var. *S. constans* n. sp.

Borkholmer Kalk: *Leperditia praelonga* n. sp. *Primitia cuneata* n. sp., *P. canaliculata* n. sp., *P. elongata* var. *obliqua* n. var., *P. rugosa* n. sp.

Leperditia Kalk: *Leperditia Krausei* n. sp., *L. ? Kiesowii* n. sp. *Isochilina frequens* n. sp. *(Leperditia brachynotus* F. Schm.) ? *P. elongata* var. *semicircularis* n. var.

Fraglichen Alters: *Strepula signata* n. sp., *S. lineata* var. *separata* 111 Obersilur.

Obersilurischen Beyrichien Kalkes: *Primitia praerupta* n. sp., *P. punctata* n. sp. *Octonaria Bollii* n. sp.

Steusloff (A.) Sedimentärgeschiebe von Neubrandenburg.

Zietschr. d. Deutsch. Geo. Ges., vol. 44, 1892.

Stschegloff (H.) Sur les Trilobites en genéral et en particulier sur ceux de Zarskœ-Selo.

Jour. fur neue Entdeckungen in der Phys. Chem. Natur. und Technologie, St. Petersburg, Nos. 1, 2, 1827, p. 227, plate vii, fig. 9.

The author proposed the new genus *Deucalion* for such species as *Nileus armadillo, Illaenus crassicauda.*

Stur (D.) Der Trilobiten Fund des Herrn Kasch in den Kalkmuggeln des Heiligenberger Schachtes bei Pribran.

Verhandl. der K. K. Geol. Reich. Jhg., 1876, pp. 31-32.

Phacops fecundus Barr. also var. *major.*

***Swinerton.** On the classification of Trilobites. (Not seen.)

Geol. Mag., Decade vi, vol. —, 1915, p. 487.

The author states in regard to Beecher's Classification of 1897, that the majority of new Trilobites found since the publication fit into it without difficulty and prove that to a large extent it is conceived on a sound basis. A few, however, do not fit in, and have therefore revealed its weakness.

Taylor (Julius S.) Notice of fragments of Trilobites of gigantic size in the Cabinet of Julius S. Taylor.

Am. Jour. Sci., ser. 2, vol. 6, p. 431, 1848.

Thomas (H. H.) Fossils of the Oxford Museum IV. Notes on some undescribed Trilobites.

Quart. Jour. Geol. Soc., vol. 56, 1900, p. 616, pls. 34-35.

Phacops (Dalmanites) coronatus n. sp. *Phacops (Dalmanites) nobilis* n. sp. and *Olenus Mitchensini* n. sp.

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Thomas (Ivor). Neue Beiträge zur Kenntnis der devonischen Fauna Argentiniens.

Zeitschr. Deutsch. Geol. Ges. lxvii, 1905, pp. 233-290, plates xi-xiv.

Homalonotus Kayseri n. sp. *Phacops argentinus* n. sp. *Dalmanites Drevermanni* n. sp., *D.* sp., *D.* sp. and *Beyrichia argentina* n. sp.

——— New Devonian fossils from Cornwall.

Geol. Mag., Dec. v, vol. vi, No. 3, 1909, pp. 97-102, plate 3.

Phacops (Trimerocephalus) pentops n. sp.

The species was classed under this subgenus on the size of the angle made by the dorsal furrows bounding the glabella, which in the case of Trimerocephalus would be about 50 deg., and Phacops 80-90 deg.

——— A note on *Phacops* (*Trimerocephalus*) *laevis* Munster.

Geol. Mag., Dec. v, vol. vi, No. 4, 1909, pp. 167-169.

The author refers the British species *Phacops (Trimerocephalus) laevis* Salter, Decade xi, pl. ix, figs. 1-5, to Salter's name of *Phacops trinucleus.*

——— Notes on the Trilobite fauna of Devon and Cornwall.

Geol. Mag., Decade v, vol. vi, 1909, pp. 193-204, pl. vii.

Phacops (Trimerocephalus) anophthalmus Frech. *Phacops (Trimerocephalus)* aff. *cryptophthalmus Emm.* as interpreted by Gümbel.

Phacops (Trimerocephalus) tripartitus n. sp. *Proctus dunhevidensis* n. sp. *Dechenella ussheri* n. sp. *Phillipsia minor* H. Woodward.

The name of Dechenella was first employed by Kayser for those members of the Proetidae with very tapering and strongly lobed glabella.

——— A new Devonian Trilobite and Lamellibranch from Cornwall.

Geol. Mag., Decade V, vol. 6, p. 537, pl. 3, 1909.

Phacops (Trimerocephalus) pentops sp. nov.

Toll (Edward von). Beiträge zu Kenntniss des Sibischen Cambrium.

Mem. de l'Acad. Imp. des Science de St. Petersburg, viii ser, vol. 8, 1899, No. x, with plates.

Microdiscus lenaicus n. sp., *M. Kocki* n. sp., *Microdiscus* sp.

Agnostus Schmidti n. sp. *Olenellus* sp. *Agnostus Czekanowski* Schm.

Dorypyge Slatskowskii Schm.

Ptychoparia Czekanowski n. sp., *P. Meglitzkii* n. sp.

Solenopleura ? sibirica Schm.

Bathyuriscus Howelli Walcott.

Anomocare Pawlowski Schm.

Liostracus Maydelli Schm.

The first part of Baron Toll's important contribution to Cambrian literature refers to the earlier work of Dr. F. Schmidt, in which he places some of these fossils as Devonian, but Toll correctly refers them to the Cambrian. One of these is *Doryphyge Slatkowskii,* described under the genus Proetus by Schmidt—the three others are referred to *Anomocare Pawlowskii* Schm., *Liostracus Maydelli* Schm., and *Solenopleura sibirica,* described by Schmidt under the genus Cyphaspis.

On plate 1 are figured some new species of Trilobites from a new locality.

Two minute species are referred to the genus Ptychoparia, which Dr. Matthew, in his review of Toll's paper, remarks might be compared with the Strenuella type of Agraulos.

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The Agnostus described as *A. Schmidti* has an unusual association, if occurring in strata with Microdiscus. The Agnostus, however, is flatter than the typical species of the Paradoxides beds, and Dr. Matthew says it may be an earlier form.

Tornquist (S. L.) On the appendages of Trilobites.

Geol. Mag. London, Decade iv, vol. 3, 1896, p. 142.

On *Parabolina spinulosa* Wahlenb. as figured by Linné, Svenska Vet. Akad. Handl., vol. 20, 1759, showing one pair of antennae at their true place.

Linné says: "Fig. 1 is one of the clearest specimens I ever saw among so many thousand. Most remarkable in this specimen are the antennae in front, which I never saw in any other example, and which clearly proves the fossil to belong to the insects."

——— Linné on the appendages of Trilobites.

Geol. Mag., London, Decade iv, vol. 3, 1896, pp. 567-569.

The author does not conform Beecher's suggestion that Linné's figure may be interpreted as the thickened border between the facial sutures, but considers them as true antennae.

——— Fördrojda Paleontologiska meddelanden.

Geol. Fören. Förhandl., No. 238, Bd. 27, Häft. 27, 1906.

Chirurus Clasonii n. sp.

Turner (H.) Trilobites and their modern representatives.

Seventh Ann. Report Proc. Crpyden Micr. Club, 1878, pp. 42-46.

Compares the Trilobites with the living Limulus.

Tullberg (Sven Axel). Skänes Graptoliter.

Sveriges Geol. Undersökning, Ser. C, n. 55, 1883.

On p. 18 the author describes a new *Calymmene dilatata* nov. and *C. trinucleina* Linrs. msc. nov.

The species was afterwards fully described and illustrated by Dr. E. Olin, Meddelande från Lund. Geol. Fältkubb Ser. B, No. 1, 1906, p. 56, plate 2, figs. 10, 11 and 12.

Pompeckj in his reclassification of the Calymmenidae, places this species under the group Synhomalonotus, section *Calymmene Tristani. Calymmene (Synhomalonotus) dilatatus* Tullbg.

Twenhofel (W. H.) The Anticosti Island faunas.

Geol. Sur. Canada Mus. Bull., No. 3, Geol. series, No. 19, October 30, 1914.

The author describes as new *Triarthrus Becki* var. *macastyensis.*

This variety is like *T. Becki* except the facial sutures are slightly more sinuous, and in front they diverge from the axis instead of converging as in *T. Beckii.*

Triarthrus jemtlandicus Lindström has a similar facial suture, though otherwise different.

Ulrich (Edward O.) Ostracoda.

Text Book of Palæontology (Zittel's) translated by C. R. Eastman, London and New York, 1900, pp. 642-648.

——— and **Bassler** (Ray S.) New American Palæozoic Ostracoda. Notes and descriptions of Upper Carboniferous genera and species.

Proc. Natl. Mus., vol. 30, 1906, pp. 149-164, pl. 40.

Paraparchites n. gen., *P. humerosus* n. sp. *Beyrichia ? radiata* J. & K., *B. ? emaciata* n. sp. *Beyrichiella gregaria* n. sp., *B. bolliaformis* n. sp., *B. bolliaformis humida* n. var. *Kirbya pinguis* n. sp., *K. centronota* n. sp.

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ULRICH (E. O.) and BASSLER (Ray S.)—Continued

Cythere ? Haworthi n. sp. *Bairdia Beedei* n. sp. and var. *adrupta.*

Cypridina subovata n. sp.

The genus Paraparchites is closely related to and probably derived from Aparchites. In the latter the ventral edges of the valves meet without appreciable or, at any rate, constant overlap, and it is this difference that is chiefly relied on to distinguish the two genera.

The authors refer the Ordovician species *Aparchites elliptia* Ulrich, to this genus.

——— and Bassler (Ray S.) New American Palæozoic Ostracoda. Preliminary revision of the Beyrichiidæ with descriptions of new genera.

Proc. U. S. National Museum, vol. xxxv, 1909, pp. 277-340, plates 37-44.

New genera: Scofieldia, Treposella, Hollina, Kirbyina, Jonesina.

New subgenus: Steusloffia.

New species: *Beyrichia moodeyi, B. waldronensis, Kloedenia centricornis, K. fimbriata, K. marginalis, K. praenunfia, K. punctillosa, K. retifera.*

New name *Beyrichia granulifera.*

The authors divide the family into 21 genera, as follows:

Beyrichia McCoy emended.

Ordovician species: *Beyrichia (Steusloffia) acuta, (B. erratica* var. *acuta* Krause), *B. (Steusloffia) antiqua, (B. antiqua* Steusloff), *B. granulifera* new name *(Bollia granulosa* Krause), *B. (Steusloffia) Linnarssoni (Strepula Linnarssoni* Krause), *B. (Steusloffia) signata (B. signata* Krause). *Beyrichia tumida (Ctenobolbina tumida* Ulrich), *B. v-scripta (Bollia v-scripta* Krause).

Silurian species: *Beyrichia admixta* Jones and Holl., *B. aequilatera* Hall, *B. Baueri* Reuter, *B. Baueri tripartita* Reuter, *B. (Steusloffia) beyrichiodides (Strepula beyrichiodides* J. & H.), *B. bolliana* Reuter, *B. Bronni* Reuter, *B. Buchiana* Jones, *B. Buchiana angustata* Reuter, *B. Buchiana incisa* Reuter, *B. Buchiana lata* Reuter, *B. Buchiana nutans* Kiesow, *B. clavata* Kolmodin, *B. Damesi* Krause, *B. diffusa* Jones, *B. dubia* Reuter, *B. grandis* Kolm., *B. granulosa* Hall, *B. interrupta (Bollia interrupta* Jones), *B. Jonesii* Boll., *B. Kloedeni* McCoy, *B. Kloedeni acadica* J., *B. Kloedeni antiquata* J., *B. Kloedeni bicuspis* Kiesow., *B. Kloedeni granulata* J., *B. Kloedeni infecta* J., *B. Kloedeni intermedia* Jones, *B. Kloedeni intermedia* sub. var. *subspissa* Jones and Holl., *B. Kloedeni nuda* Jones, *B. Kloedeni protiberans* Boll., *B. Kloedeni subtorosa* J., *B. Kloedeni torosa* Jones, *B. Kloedeni verruculosa* Jones, *B. Kochii* Boll, *B. lata* Hall, *B. lauensis* Kiesow. *B. Lindsromi* Kiesow, *B. MacCoyiana* Jones, *B. MacCoyiana sulcata* Reuter, *B. Moodeyi* n. sp., *B. muldensis* Chapman, *B. nodulosa* Boll, *B. nodulosa expansa (B. Lindstromi* var. *expansa* Kiesow), *B. Noetlingi* Reuter, *B. Noetlingi conjuncta* Reuter, *B. plagosa* Jones, *B. plicata (Entomis plicata* Krause), *B. pustulosa* Hall, *B. reticulata (Strepula reticulata* (limbata in text) Krause), *B. Reuteri* Krause, *B. salteriana* Jones, *B. scanensis* Kolmodin, *B. (Steusloffia) simplex (Strepula simplex* Krause), *B. spinulosa* Boll, *B. Steusloffi* Krause, *B. trilobata (Entomis trilobata* Krause), *B. tuberculata (Battus tuberculatus* Kloeden), *B. tuberculata bigibbosa* Reuter, *B. tuberculata foliosa* Jones, *B. tuberculata spicata* Jones, *B. tuberculata Kockiana* Reuter, *B. umbonata (B. bolliana umbonata* Reuter), *B. waldronensis* n. sp.

Devonian species: *Beyrichia aurita* Richter, *B. devonica* J. & W., *B.* new species *(B. Kloedeni* var. Jones).

Of the 225 named species and varieties, varying in time from the Cambrian to the Permian, and referred to the genus Beyrichia, only 73 species and varieties listed above are referred to the genus.

The authors places under Group *Beyrichia Kloedeni:*

Beyrichia Kloedeni, B. MacCoyiana, B. Bollinana, B. Kockii, B. tuberculata-Kockiana, B. Moodeyi and *B. Lindstromi.*

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ULRICH (E. O.) and BASSLER (Ray S.)—Continued

The valves are usually short, semi-elliptical in outline, and sharply lobed.

Group *Beyrichia Buchiana:*

The anterior and median lobes are joined, but the anterior lobe is thinner and the ventral connection proportionally thicker than usual, the combination giving to the united lobes a striking similarity to the horseshoe ridge in the *B. ungula* section of Bollia.

Group *Beyrichia tuberculata:*

This section comprises a number of species, in which the anterior and posterior lobes are broken up by minor furrows—the posterior lobe into 2, the anterior lobe into from 2 to 6 or 7 node-like parts. *Beyrichia Buchiano-tuberculata* Reuter, would represent about the simplest type, and *B. pustulosa* Hall and *B. Noetlingi* Reuter the most complex.

Group *Beyrichia Salteriana:*

The species of this group are not as large as those of the preceding groups and differ in the fullness of their lobes and proportionate narrowness of the furrows.

Group *Beyrichia clavata:*

The small group includes *B. Jonesii* Boll, and possibly *B. umbonata* Reuter.

Subgenus *Steusloffia,* new.

Group *Beyrichia Linnarssoni:*

This group includes *B. antiqua, B. acuta, B. simplex, B. Linnarssoni, B. signata, B. beyrichiodes* and probably *B. erratica* Krause.

Group *Beyrichia interrupta:*

The illustrations given by the authors show possible derivation of the *B. interrupta* group from Eurychilina, and its relations to *Beyrichia clavata* group and to Steusloffia.

The authors place under Kloedenia the following species:

Kloedenia apiculata Jones, *K. Barretti (Beyrichia Barretti* Wel.), *K. centicornis* n. sp., *K. concinna (Beyrichia concinna* J. & H.), *K. fimbriata* n. sp., *K. granulata (Beyrichia granulata* Hall), *K. initialis (Beyrichia initialis* Ulrich), *K. intermedia (B. intermedia* J. & H.), *K. intermedia marginata* J. & H., *K. jerseyensis (Beyrichia jerseyensis* Weller), *K. Kummeli (Beyrichia Kummeli* Weller), *K. manliensis (Beyrichia manliensis* Wel., *K. manliensis deckerensis (Beyrichia deckerensis* Weller), *K. marginalis* n. sp., *K. montaguensis (Beyrichia momtaguensis* Wel.), *K. nearpassi (Beyrichia nearpassi* Weller), *K. oculina (Beyrichia oculina* Hall), *K. parasitica (Beyrichia parasitica* Hall), *K. praenuntica* n. sp., *K. punctillosa* n. sp., *K. retifera* n. sp., *K. scotica (Beyrichia Kloedeni* var. *scotica* J. & H.), *K. simplex* Jones, *K. Smocki (Beyrichia Smocki* Weller), *K. sussexensis (B. sussexensis* Weller), *K. tuberculata (Beyrichia tuberculata* Salter), *K. wallpackensis (Beyrichia wallpackensis* Weller), *K. Wilckensianna (Beyrichia Wilckensianna* Jones), *K. Wilckensianna plicata (Beyrichia Wilckensianna plicata* Jones).

Of the above species *K. initalis* and *K. praenuntia* are Middle Ordovian and *K. simplex* late Devonian. All the others Silurian.

The genus Kyammodes Jones is closely allied, distinguished chiefly by the much greater inequality of its valves, the thick ventral edge of the right overlapping the smaller left valve. There are some peculiar differences in lobation also.

Tetradella Genotype *T. quadrilirata* H. & W.

List of Ordovician species:

Tetradella ? affinis (Beyrichia affinis Jones), *T. bohemica (Beyrichia bohemica* Barr. MSS. Jones), *T. bussacensis (B. bussacensis* Jones), *T. carinata (B. carinata* Krause), *T. complicata (B. complicata* Salter), *T. complicata decorata (Beyrichia complicata* var. *decorata* Jones), *T. ? digitata (Beyrichia digitata* Krause), *T. ? digitata separata (Beyrichia digitata* var. *separata* Steusloff), *T. (Kiesowia) dissecta (Beyrichia dissecta* Krause), *T. ? erratica (Beyrichia erratica* Krause), *T. harpa (B. harpa* Krause), *T. ?*

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ULRICH (E. O.) and BASSLER (Ray S.)—Continued

lacunata (Beyrichia lacunata J. & H.), *T. (Kiesowia) mamillosa (Beyrichia mamillosa* Krause), *T. marchica (B. marchica* Krause), *T. marchica angustata (B. marchica* var. *angustata* Krause), *T. marchica lata (B. marchica* var. *lata* Krause), *T. palmata (Beyrichia palmata* Krause), *T. quadrilirata (Beyrichia quadrilirata* H. & W.), *T. (Kiesowia) radians (B. radians* Krause), *T. ribeiriana (B. ribeiriana* Jones), *T. simplex (T. quadrilirata* var. *simplex* Ulrich), *T. subquadrans* Ulrich.

Ceratopsis Genotype *Beyrichia Chambersi* Miller.

The genus includes *C. robusta* Ulrich, *C. intermedia* Ulrich, *C. oculifera* Hall, all Upper Ordovician species, and *C. hastata (Beyrichia hastata* Barr.)

Stenobolina Genotype *Beyrichia ciliata* Emmons.

Group of *Ctenobolina ciliata.*

Ordovician species:

Ctenobolina alata Ulrich, *C. bispinosa* Ulrich, *C. ciliata* Emmons, *C. curta (C. ciliata* var. *curta* Ulrich), *C. Duryi (Beyrichia Duryi* Miller), *C. emaciata (C. ciliata* var. *emaciata* Ulrich), *C. Guillieri (B. Guillieri* Tormelin), *C. Hammelli (B. Hammelli* Miller and Faber), *C. obliqua* Ulrich, *C. oblonga (Entomis oblonga* Steusloff).

Silurian species:

Ctenobolina granosa Ulrich, *C. punctata* Ulrich.

Devonian species:

Ctenobolina papillosa Ulrich.

Group of *Ctenobolina subcrassa.*

Ordovician species:

Ctenobolina crassa Ulrich, *C. fulcrata* Ulrich, *C. impressa (Entomis impressa* Steusloff), *C. major (Bollia major* Krause), *C. minor (Bollia minor* Krause), *C. subcrassa* Ulrich, *C. umbonata (Entomis umbonata* Steusloff).

Silurian species:

Ctenobolina auricularis (Bollia auricularis Jones).

Devonian species:

Ctenobolina mimima Ulrich.

Mississippian species:

Ctenobolina loculata Ulrich.

Drepanella. Genotype *D. crassinoda* Ulrich.

Ordovician species:

Drepanella ampla Ulrich, *D. bigeneris* Ulrich, *D. crassinoda nitida* Ulrich, *D. elongata* Ulrich, *D. macra* Ulrich, *D. Richardsoni (Beyrichia Richardsoni* Miller), *D. Richardsoni canadensis* Ulrich.

This wholly American genus is remarkable for the extreme variability of the nodes within the central area of the valves.

Scofieldia new genus. *Genotype Drepanella bilateralis* Ulrich.

Treposella nov. gen. genotype *Beyrichia Lyoni* Ulrich. This genus proposed for a link in the evolution of Hollina from Beyrichia.

Hollina new genus. Genotype *Ctenobolina insolens* Ulrich.

Devonian species:

Hollinia antespinosa Ulrich, *H. armata* Ulrich, *H. cavimarginata* Ulrich, *H. informis* Ulrich, *H. spiculosa* Ulrich.

All these species were described as species of Ctenobolina by Ulrich.

Carboniferous species:

Hollina granifera (Bollia granifera Ulrich), *H. radiata (Beyrichia radiata* J. & K.), variety *cestriensis* Ulrich, *H. longispina (Beyrichia longspina* J. & K.), *H. emaciata (Beyrichia ? emaciata* U. & B.).

The authors include under this genus *Beyrichia Kolmodini* and *B. tricollina* Ulrich.

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ULRICH (E. O.) and BASSLER (Ray S.)—Continued

Kloedenella new genus. Genotype *Kloedenia Pennsylvanica* Jones.

The genus includes some 8 to 10 species, two of them probably only varieties ranging in time from the Clinton to Middle Devonian. The British species *Beyrichia ? bicaesa* J. &. K., may be included.

This genus is divisable into two sections:

In the first, the genotype, the posterior and median furrows are shorter than in section number 2, and the anterior furrow either wanting or more or less well-developed.

In the 2nd section, of which *Beyrichia Halli* Jones, is a good example, the posterior and anterior furrows are long, subequal and extending nearly or quite across the valve.

Kirkbyina new genus. Genotype *Beyrichiella ? reticosa* Jones and Kirkby.

Kirkbyina resembles Primitia, but is readily distinguished by its overlapping valves and thicker anterior end.

Beyrichiella J. & K. Genotype *B. cristata* J. & K.

The shell is relatively longer than that of Kirkbyina, and its larger valve is not the right, as in that genus, but the left.

The authors include under Beyrichiella *B. cristata* and *Kirkbyina annectens* the type of Synaphe Jones and Kirkby, also *Ulrichia confluens* Ulrich.

The generic term Synaphe was used by Huebner, therefore preoccupied.

Beyrichiopsis J. & K. Genotype, *B. fimbriata* J. & K.

Other typical species are the Carboniferous species:

Beyrichiopsis cornuta, B. subdentata, B. fortis, B. granulata and *B. simplex,* all described by Jones and Kirkby.

Jonesina new genus. Genotype *Beyrichia fastigiata* J. & K.

The following species are referred to *Jonesina Beyrichia arcuata* Bean: *B. Bradyana* J. & K., *B. craterigera* Brady MS. J. & K., *B. fodicata* J. & K. *Carboniferous* species, also *Beyrichiella bolliaformis* var. *tumida* and *B. gregaria* Ulrich and Bassler.

——— Ostracoda.

Geol. Sur. Maryland Lower Devonian, Baltimore, 1913, pp. 513-542, pls. 97-98.

The following species are described:

Leperditia altoides Weller, 1903, *L. elongata* Weller, 1903, *L. gigantea* Weller, 1903. *Aparchites Gordoni* n. sp. *Primitia posttturgida* n. sp., *P. ? cumberlandica* n. sp., *P. ? concentrica* n. sp.

Primitiella variolata n. sp. *Ulrichia aequalis* n. sp. *Strepula irregularis* Jones and Holl, 1886. *Halliella seminulum* var. *longa* n. var., *H. ? triplicata* n. sp. *Aechimina cuspidata* Jones and Holl, 1869.

Mesomphalus n. gen.

Carapace of medium size, 1 mm. to 2½ mm. in length, equivalved; valve moderately convex, oblong, subquadrate in outline, with a small ventral pit lying between two rather small rounded nodes; edges of valves rather thick, usually concealed by a flat border, which overhangs it; ventral pouch somewhat elongated, sausage-shaped, occupying nearly the full length of the ventral side.

Type *Mesomphalus hartleyi* n. sp., *M. submarginata* n. sp.

Ctenobolbina denticula n. sp., *C. dubia* n. sp. *Bollia americana* n. sp., *B. curta* n. sp., *B. irregularis* n. sp., *B. jugalis* n. sp., *B. ungula* Jones, 1891. *Kloedenia centricornis* Ulrich and Bassler, 1908, *K. fimbriata* U. & B., 1908, *K. nearpassi* Weller, 1903, *K. Kümmeli* Weller, 1903, *K. sussexensis* Weller, 1903, *K. Barretti* Weller, 1903, *K. Pennsylvanica* Jones, 1889, *K. Clarkei* Jones, 1890, and var. *paupera* U. & B., 1908, *K. turgida* U. & B., 1908, for *K. Pennsylvanica* Jones, in part, 1889, figs. 8 and 9, not figs. 5 and 7; also var. *ventrosa* U. & B. for *K. Pennsylvanica* Jones, 1889, figs. 7 a-b, not figs. 5, 6, 8 and 9,

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ULRICH (E. O.) and BASSLER (Ray S.)—Continued

Thilipsura multipunctata n. sp. *Octonaria angulata* n. sp., *O. inequalis* n. sp., *O. simplex* Krause, 1891.

Craterellina n. gen.

The most obvious characteristic of the genus is the presence of a crater-like depression, bordered by a more or less distinctly elevated rim, occupying the anterior one-third or one-half of each valve.

Craterellina robusta n. sp., *C. oblonga* n. sp.

Bythocypris punctatulata var. *arctatum* n. var. *Pontocypris arcuata* n. sp., *P. mawii* var. *breviata* Jones, 1889, and *Pachydomella longula* n. sp.

Van Ingen (Gilbert). The Silurian fauna near Batesville, Arkansas. School of Mines Quart., vol. 23, 1901, No. 1.

The author refers to certain plates which were not issued with the publication.

The author remarks on the family Acidaspidae Barr. (used for the xii family, without a family name), that this term is used in preference to Odontopleuridae of Burmeister (used by this author for a family name), which latter name had more recently been suggested by Etheridge and Mitchell in 1897, inasmuch as the genus Acidaspis Murch. (January, 1839,) and Emmrich's name Odontopleura (1839) is of later date. There was no date of publication given on Emmrich's De. Trib. Dissertates.

The author refers to Murchison's Acidaspis, on p. 55, as a similar genus.

The author quotes Barrande, Vogdes and Clarke on the family and gives figures of *Odontopleura ovata, Selenopeltis Buchi, Ceratocephala prevosti* and *C. Danai, Dicranurus humatus* and *Acidaspis Brighti* in the text. The author describes seven species from the Niagaran limestone of St. Clair Springs.

Odontopleura Ortonti Foerste, *O. arkansana* nov. with fig. in text.

Ceratocephala gonita Warder *(depauperata), C. nodulata* nov., fig. of head in text, *C. coalescens,* fig. glabella in text.

Acidaspis quinquespinosa Salter MS., fig. 12 head in text.

The unpublished plates of Acidaspis Salter and Fletcher (two plates), the second one (figs. 10-12) of *Acidaspis quinquespinosus* nov. of a small head with spined occipital ring, and an entire specimen (fig. 12) with a median node to the occipital ring. Van Inger's figure is more in keeping with Lake's fig., pl. 7, fig. 4.

Acidaspis obsoleta nov., figs. 13 and 14 in text.

Ampyx niagarenis nov., fig. 15 in text, compares *A. parvulus* Forbes, differs in its longer and narrower glabella, and less tumid cheeks.

Proetus corrugatus nov., figs. 16-17 in text, head and tail; *P. subanulatus* nov., fig. 18 in text, tail.

Arges phyctenoides Green, depauperatus.

The author uses the preoccupied term Arges referred by Gurich to Ceratages.

Van Ingen places *Lichias Hanovensis* Miller and Gurley and *L. Byrneansus* M. & G. as syn. to Green's species.

Arges arkansanus nov., fig. 19 in text, head compares *Lichas Grayi* Fletcher. *Lichas nereus* Hall.

Encrinurus punctatus Wahl., refers *E. ornatus* H. & W., to this.

Dalmanites (Synphoria) viglans Hall, *D. (Synphoria) arkansanus* nov., figs. 20-22, heads and tail, broad and narrow forms.

These forms differ in the well-marked triangular outline of both cephalon and the frontal glabellar lobe, of the American Ordovician and Silurian species. Their nearest ally appears to be *Phacops Brongniartii* Portlock, which has been referred to the subgenus Pterygometopus.

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Vogdes (A. W.) Notes on Palæozoic Crustacea, No. 5. Carboniferous Trilobites from Missouri.

Proc. Cal. Acad. Sci., 2nd ser., vol. 6, 1896, p. 197, fig. in text.

Proetus ? placidus nov.

This species from Chouteau limestone of Sedalia has the lateral lobes of the pygidium smooth, similar to the Silurian species of France named by Rouault *Calymmene Arago* and *C. Salteri*, although it belongs to a different group of the Proetidae, with only nine thorax segments. The head is parabolic in form, genal angles rounded. The eyes are similar in location to those of *Phillipsia Sampsoni* from the same locality. The tail has eight axial joints with indications of two faintly defined segments on the lateral lobes.

——— The genus Encrinurus: its history, its species, its proper division in the family of Trilobites.

Trans. San Diego Soc. Nat. Hist., vol. 1, 1907, No. 2, pp. 61-82, plates 1-3.

The author divides the family into two divisions:

Encrinurus. Genotype *E. punctatus* Wahl.

Cryptonymus. Genotype *C. variolaris* Brong.

Although Eichwald used this term in 1825 for certain Asaphidae and Illaenidae, he used the same term in 1840 for such species as *Calymmene punctatus* and *C. variolaris*, which was adopted by Angelin. The term should stand under the strict rule of priority for the second use of the term.

Cryptonymus Eichwald, 1840.

The author uses it for the second species included by Eichwald in 1840. Figures and descriptions of *Encrinurus punctatus* Walh., *E. vigilans* Hall, *E. ornatus* H. & W., *E. Threcheri* Foerste, *E. Trentonensis* Walc., *E. nereus* Hall, *E. Eagani* Miller, *E. Americanus* Vogd., *E. sex-costata* Salt., *E. delitides* Shumard, *E. Barrandei* DeKon., *E. Mitchelli* Foerste, *E. schisticola* Törnq., *E. Seebachi* Schm., *E. multi-segmatus* Portl., *E. fallax* Reed, as given.

Under the genus Cryptonymus the author includes *Cryptonymus variolaris* Brong., *C. expansa* Hasw. Henderson, 1868, refers the free cheeks of *Zethus Payeii* Haswell, to *E. expansus*. *C. obtusus* Ang., *E. raricostatus* Wal., *C. laevis* Ang., *Encrinurus Bowningi* Foerste, *E. tuberculatus* Collie.

Certain species described by Barrande under the genus Cromus have been referred by Novak to the genus Encrinurus on account of the direction of the facial sutures, which are the same in both genera. They are *Cromus Beaumonti, C. Bohemicus, C. transient* and *C. intercostatus*. The *Encrinurus Novaki* Frech, has been referred to *Encrinurus Beaumonti* var., *Novaki* by Gornani and Le Regny.

Remarks the name of *Encrinurus punctatus* has often been applied to a common Scandinavian species, first illustrated by Wahlenberg in an advanced publication of his paper in 1818. Petrificata telluris Svencanae, Brunnich's fossil from Bohemia, from a soft yellow limestone, may be the *Cromus Beaumonti* Barr. The author remarks, in his paper, on two very imperfect petrified impressions of this fossil, that it had across the fossil body impressed spotted rings, which marks are sufficient to distinguish them from other species. The size of it seems to vary greatly, as my collection contains one small and one very large back part of this species; each has 18 joints. The only Bohemian Encrinuridæ recorded are those described under Cromus by Barrande and Novak.

Verneuil (E.) Observations sur la description de quelque Trilobites russes par M. A. de Volborth.

Bull. Soc. Geol. de France, 2nd ser., vol. 5, 1848, p. 384.

Review of Dr. Volborth's paper on the genus Zethus.

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Wade (A.) On the Llandovery and associated rocks of Northeastern Montgomeryshire.

Quart. Jour. Soc. London, vol. 67, No. 267, 1911, p. 415, plates 33-36.

Notes on the Palæontology of the area 1—Trilobita.

The author describes the following species:

Trinucleus intermedius sp. nov.

Refers *T. concentricus* Hall, Pal. N. Y., vol. 1, p. 249, pl. 65, figs. 4a-4c; also p. 255, pl. 67, figs. 1a-h, to the new species.

Dionide sp.

Ostracoda Melanella n. gen.

The author gives the following description of the genus:

Carapace small; equivalves moderately convex, subcircular, rather flattened anteriorly; hinge straight; valves with a small, faintly raised horseshoe ridge confined to the posterior half, enclosing a small semicircular sulcus; edges simple.

The genus is closely allied to Jonesella of Ulrich.

Melanella hemidiscus gen. et sp. nov.

Primitiella unicornis Ulrich. *Primitia Ulrichi* Jones, *P. tumidula* Ulrich. *Ctenobolina* cf. *ciliata* Emmons. *Bolla lata* V. & H. *Krausella arcuata* Ulrich.

Walcott (Charles D.) Description of new genera and species of fossils from the Middle Cambrian.

Proc. U. S. Natl. Mus., vol. 11, 1888, Washington, 1889, pp. 441-446.

The author includes under the genus *Dorypyge* the following species:

D. richtofeni with *Olenoides nevadensis, O. quadriceps, O. wasathchensis* and *O. curticei*—a new species which he illustrates on p. 444, fig.; also the new genus *Karlia,* named in honor of Dr. Karl Rominger.

Genotype Karlia minor n. sp.

The author refers *Menocephalus salteri* Rominger, 1887, Proc. Acad. Nat. Sci., pt. 1, p. 16, pl. 1, fig. 6, to a new species: *Karlia stephenensis.*

The Bathyurus Rominger, Proc. Acad. Nat. Sci. Phila., pt. 1, pl. 18, fig. 8, is referred to *Bathyuriscus (Kootenia) dawsoni* n. sp.

A new genus, Ogygopsis, is founded on the species *Ogygia Klotzi* Rominger, it differs from Ogygia in having a well-defined ocular ridge, and in the narrow palpebral lobe.

——— Cambrian Fossils, Yellowstone National Park.

Mong. U. S. Geol. Survey, No. 32, part 2, pp. 440-478, plates, 1899.

Agnostus interstrictus White, *A. bidens* H. & W., *A. tumidosus* H. & W.

Ptychoparia Penfieldi n. sp., *P. antiquata* Salt., *P. (Euloma) affinis* Walc., *P. Llanoensis* Walc., *P.* sp. *Crepicephalus Texanus* Shumard, *P. (Lonchocephalus) hamulus* Owen, *P. (Lonchocephalus) Wisconsensis* Owen, *P.? diademata* Hall.

Arionellus levis n. sp. *Arionellus* sp. *Liostracus parvus* n. sp. *Solenopleura Weedi* n. sp. *Zacanthoides* sp. *Bathyuriscus* sp.

——— Precambrian fossiliferous formations.

Bull. Geol. Soc. Amer., vol. 10, pp. 189-244, 1899, plates.

Beltin Danai n. gen. et sp.; also figures of Pterygotus, Eurypterus, Slimonia and Stylonurus for comparison.

The author refers to the genus Beltina certain fragmentary remains of a crustacean collected from the calcareous Greyson shales of Montana, and remarks, as far as can be judged from what we now know of it, is referable to the Merostomata.

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WALCOTT (Charles D.)—Continued

——— *Asaphus Emoryi* Hall. Description and figure of in Palæontogia.

Universalis Fasc. 11, plate 28, 1904.

——— The Cambrian fauna of India.

Proc. Washington Acad. Sci., vol. 7, 1905, pp. 251-256.

Notes on the genus *Redlichia Noetlingi* Redlich. *Ptychoparia Richeri* Redlich, *P. Warthi* and *Olenus indicus.*

——— Cambrian faunas of China.

Proc. U. S. Natl. Mus., vol. 29, 1905, pp. 1-106.

Trilobita: *Agnostus Kusanensis* n. sp. *Microdiscus orientalis* n. sp. *Redlichia chinensis* n. sp., *R. finalis* n. sp., *R. nobilis* n. sp. *Redlichia* sp. *Olenoides ? cilix* n. sp. *Dorypyge bispinosa* n. sp. *Dorypygella typicalis* n. gen. et sp.

The genus is characterized by the peculiar glabella, narrow frontal margin, and spinose pygidium.

Dorypygella alcon n. sp., *D. alastor* n. sp.

The *Dorypygella typicalis* is a synonym of *Teinistion Lansi* Monke. *Damesella Blackwelderi* n. gen. et sp.

The genus differs from Dorypyge in the character of the head, as far as known. The thorax and pygidium are essentially of the same type. The pygidium of Damesella is of the type of Olenoides and the pleural lobes of the thoracic segments are also of the same type, but the thorax of Olenoides has eight segments, and a strong median spine on the axis, while the thorax of Damesella has twelve or more segments and without a median spine.

Damsella nov. gen. genotype, *D. Blackwelderi* Walcott.

Damesella bellagranulata n. sp., *D. brevicauda* n. sp., *D. chione* (a syn. of *Stephanocare Richthofeni* Monke), *D. sinensis* Bergeron. *Dicellocephalus sinensis.*

Agraulos abaris n. sp., *A. abrota* n. sp., *A. acalle* n. sp., *A. agenor* n. sp., *A. dirce* n. sp., *A. divi* n. sp., *A. dolon* n. sp., *A. dryas* n. sp.

Anomocare alcinoe n. sp., *A. Bergioni* n. sp., *A. bianos* n. sp., *A. biston* n. sp., *A. ? butes* n. sp., *A. ? daulis* n. sp., *A. daunus* n. sp., *A. decelus* n. sp., *A. tatian* n. sp., *A. temenus* n. sp.

Anomocarella chinensis n. gen. et sp.

The genus differs from Anomocare in the absence of glabella furrows and the presence of a relatively narrow, flattened frontal rim.

Anomocarella baucis n. sp., *A. albion, A. carne* n. sp.

Arionellus agonius n. sp., *A. ajax* n. sp., *A. alala* n. sp.

Menocephalus acerius n. sp., *M. agave* nov., *M. Velenus* nov. n. sp., *M. ? depressus* n. sp.

Pagodia lotos n. gen. et sp.

This genus differs from Dolichometopus in the narrowing instead of widening of the glabella in front; in the presence of small instead of large eye-lobes, short instead of long postero-lateral limbs, and obscure glabellar furrows.

Pagodia bia n. sp., *P. dolon* n. sp., *P. macedo* n. sp., *P. lotos* n. sp.

Pterocephalus asiatica n. sp., *P. busiris* n. sp.

Ptychaspis acamus n. sp., *P. cacus* n. sp., *P. cadmus* n. sp., *P. calchas* n. sp., *P. callisto* n. sp., *P. calyce* n. sp., *P. campe* n. sp., *P. ceto* n. sp., *P.* sp.

Ptychoparia aclis n. sp., *P. ? batia* n. sp., *P. ? bromus* n. sp., *P. ceus (Liostracina Krausei* n. sp., Monke), *P. constricta* n. sp., *P. dryope* n. sp., *P. granulosa* n. sp., *P. impar* n. sp.; also var. *P. ligea* n. sp., *P. mantoensis* n. sp., *P. tellus* n. sp., *P. tenes, P.* sp., *P. titiana* n. sp., *P. theano* n. sp., *P. tolus* n. sp.

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WALCOTT (Charles D.)—Continued

Ptychoparia (Liostracus) toxeus n. sp., *P. (Liostracus) trogus* n. sp., *P. (Liostracus) tutia* n. sp.

Proampyx subgen. of *Ptychoparia* (name used by Frech, 1902, Lethaea Geol., 1 Theil Leathaea Pal. 11, p. 66, for *Anomocare acuminatum* Ang.).

Ptychoparia (Proampyx) burea n. sp.

Shantungia spinifera n. gen. et sp. *Solenopleura alderus* n. sp., *S. acantha* n. sp., *S. acidalia* n. sp., *S. agno* n. sp., *S. belus* n. sp., *S. beroe* n. sp.

Dikelocephalus ? baubo n. sp., *D. ? brizo* n. sp. *Crepicephalus damia* n. sp., *C. magnus* n. sp.

Dolichometopus alceste n. sp., *D. deois* n. sp., *D. derceto* n. sp., *D. dirce* n. sp.

Illaenurus canens n. sp., *I. ceres* n. sp., *I. dictys* n. sp.

Ostracoda: *Bradoria Bergeroni* n. sp., *B. enyo* n. sp., *B. eris* n. sp., *B. fragilis* n. sp., *B. sterope* n. sp., *B. Woodi* n. sp.

——— Cambrian faunas of China.

Proc. U. S. Natl. Museum, vol. 30, 1906, pp. 563-595.

Blackwelderia n. gen. *Dorypyge Richthofeni laevis* n. var. *Blackwelderia cilix* Walc. Genotype *B. sinensis* Bergeron.

Agraulos armatus n. sp., *A. nitida* n. sp., *A. obscura* n. sp., *A. regularis* n. sp., *A. uta* n. sp., *A. vicina* n. sp., *A. ? capax* n. sp., *A. ? melie* n. sp.

Anomocare Bigsbyi n. sp., *A. eriopia* n. sp., *A. flava* n. sp., *A.* sp. ?

Anomocarella contigua n. sp., *A. irma* n. sp.

Ptychaspis bella n. sp.

Ptychoparia comus n. sp., *inflata* n. sp., *P. Lilia* n. sp., *P. nereis* n. sp., *P. undata* n. sp., *P. vesta* n. sp., *P.* sp. ? *P. ? Maia* n. sp., *P. (Liostracus) intermedia* n. sp., *P. (L.) subrugosa* n. sp.

Solenopleura pauperata n. sp.

Dolichometopus hyrie n. sp.

——— Cambrian Geology and Palæontology, No. 5. Cambrian sections of the Cordilleran area.

Smithsonian Miscellaneous Collections, vol. 53, Dec. 10th, 1908.

The names of some new species are given, but without descriptions.

——— Mount Stephen rocks and fossils.

Canadian Alpine Journal, vol. 1, No. 2, pp. 232-248, 4 plates, 1908.

The author illustrates *Olenellus Gilberti* Meek. *Anomolocaris ? Whiteavesi* n. sp., *A. Canadensis* Whiteaves, *A. ? acutangulus* n. sp. *Oryctocephalus Reynoldsi* Reed. *Bathyuriscus occidentalis* Matt., *B. ornatus* Walc. *Karlia stephensis* Walc., *Ptychoparia cordillerae* Rominger, *P. palliseri* n. sp. *Agnostus montis* Matt. *Burlingia Hectori* Walc. *Dorypge (Kootenia) Dawsoni* Walc. *Zacanthoides spinosus* Walc. *Bathyuriscus rotundatus* Rominger. *Neolenus serratus* Rominger. *Ogygopsis Klotzi* Rominger.

No description of the species was given.

——— Cambrian Geology and Palæontology, No. 2. Cambrian Trilobites.

Smithsonian Misc. Collections, No. 1805, vol. 53, 1908.

Burlingidae: This family includes the genera Burlingia and Schmalenseeia. The genotype of the genus is *Burlingia Hectori* Walcot. The facial sutures and free cheeks relate *Burlingia* to some forms of the Cheiruridae, while the pygidium of Burlingia recalls the simple pygidium of Paradoxides, and the pygidium of *Schmalenseeia* recalls that of Amphion.

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WALCOTT (Charles D.)—Continued

Albertella n. genus, Genotype *A. Helena* n. sp.

The genus should be compared with the genus Zacanthoides. The cephalons of the two genera are generically the same. The thoracic segments are the same type, but the third or fourth segment of the thorax of Albertella is extended into long pleural spines, and the thorax has seven instead of nine segments as in Zacanthoides. The pygidium has one pair of spines instead of many spines, as in Zacanthoides.

Albertella Bosworthi n. sp.

Oryctocare new genus, genotype *O. Geikiei* n. sp.

The cranidium of the cephalon of this genus is much like that of Oryctocephalus, but the thorax and pygidium are unlike. The pleurae are of the *Olenus* type, while the pygidium is broad and of the Bathyuriscus type.

Zacanthoides idahoensis n. sp. *Neolenus inflatus* n. sp., *N. intermedius* n. sp., *N. intermedius pugio* n. variety, *M. superbus* n. sp.

Bathyuriscus ornatus n. sp.

——— Middle Cambrian Merostomata.

Smithsonian Mis. Coll., vol. 57, No. 2, Washington, 1911.

In this paper two genera, Sidneyia and Amiella, are described.

Sidneyia inexpectans Walc. *Amiella ornata* Walc. *Neolenus serratus* Rominger. *Beltins Danai* Walc.

The new genera are placed in a new sub-order Limulava of the order Eurypterida.

Sidneyia with its four pairs of cephalo-thoracic appendages and simple antennae approaches the Trilobita, which has a similar scheme of cephalic appendages.

——— Cambrian Geology and Palæontology, No. 6. Olenellus and other genera of the Mesonacidæ.

Smithsonian Misc. Collections, vol. 53, No. 6, 1910, pp. 231-422, Pls. 22.

The author under the family Mesonacidae places:

1. Nevadia n. gen. genotype *N. Wetksi* n. sp.

In the type of this genus the posterior 11 segments have only the axial lobe and a spinose continuation on each side. The spinose extensions of the posterior segments are proportionally much rounder and smaller than those of the anterior 17 segments. The pygidium is small without pleural lobes and transverse furrows.

2. Mesonacis: This form is essentially the same as Elliptocephala, but it has an enlarged third segment in the adult, and a strong spine on the fifteenth segment.

The species referred to Mesonacis are *M. vermontana* Hall, *M. Mickwitzi* Schmidt, and *M. Torrelli* Moberg.

Elliptocephala Emmons, genotype *E. asaphoides* Emmons.

In the genus the posterior five segments are more highly developed than the primitive segments of Nevadia, but not as much so as the segments anterior to them.

Callavia Matthew, genotype *Olenellus (Holmia) bröggeri* Walcott.

This genus was proposed by Matthew, Am. Geol., vol. 19, p. 397, 1897, for *O. bröggeri* and *O. callavii* Lapw., on acccount of the glabella differing from that of *Olenellus (Holmia) Kjerulfi.*

Callavia has a trace of the constricted pleurae of the posterior portion of the thorax in the two last segments. The broad thorax of Callavia with the falcate extensions of the pleurae are unlike the narrow thorax of Holmia, with its spinos pleural extensions.

The glabella of Callavia is narrower and more primitive, and its intergenal spine is less primitive. The pleural furrow of Callavia is narrow and oblique, like that of Paradoxides, while the pleural furrow of Holmia and Wanneria is broad and straight.

The segments of Callavia appear to be nearer to Elliptocephala, than to those of Holmia.

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WALCOTT (Charles D.)—Continued

The following species are referred to the genus: *Callavia bicensis* Walc., *C. bröggeri* Walc., *C. burri* Walc., *C. callawei* Lapw., *C. cortlandi* Raw. Mss., *C. crosbyi* Walc. and *C. nevadensis* Walc.

Holmia Matthew genotype *Paradoxides Kjerulfi* Linnarsson, 1871.

The species referred to Holmia are *H. kjerulfi, H. lundgreni* and *H. rowei* Walc., the only American species.

Wanneria new genus. Genotype *W. Walcottanus* Wanner.

This genus has a uniform series of thoracic segments, with pleurae terminating in broad falcate extensions beyond the body line, without the spinose ends as in Holmia.

The species referred to Wanneria are: *W. Walcottanus* Wanner, *W. gracile* Walc. and *W. Halli* Walcott.

Paedeumias n. gen. Genotype *P. transitans* Walcott.

The distinctive characters of the genus are in the presence of the rudimentary segments and pygidium.

Olenellus Hall. Genotype *O. Thompsoni* Hall.

The author remarks that *Olenellus Thompsoni* passes through a *Holmia* and *Paedeumias* stage before becoming a true *Olenellus.*

The American species are *Olenellus Thompsoni* Hall and variety *O. crassimarginatus* Walcott, *O. gilberti* Meek, *O. fremonti* Walc., *O. canadensis* Walc., *O. claytoni* Walc., *O. argentus* Walc., *O. walcotti* S. & F.

The European species are *O. gigas* Peach, *O. lapworthi* Peach, *O. reticulatus* Peach and *Olenellus* n. sp. undt.

All these species have telsonated pygidia and may be classed under the family name of Olenellidae.

Peachella new genus. Genotype *P. iddingsi* Walcott.

The genus is only known by the head, which has blunt, tumid genal spines; elongated, narrow glabella; small eyes and marked convexity.

Olenelloides Peach. Genotype *O. armatus* Peach.

This genus is clearly defined by its large cephalon and primitive thorax and pygidium. The author remarks it is essentially a larval form of *Olenellus.* The author diagrammatically represents these Lower Cambrian genera under the family of *Mesoncidae.* Left-hand branch Nevadia, Callavia, Holmia, Wanneria,—Paradoxides. Right-hand branch Nevadia, Mesonacis, Elliptocephala, Paedeumias, Olenellus, Peachella—Ollenoides.

——— Cambrian Geology and Palæontology, No. 7. Cambro-Ordovician boundary in British Columbia, with description of Fossils.

Smithsonian Mis. Coll., vol. 57, No. 7, 1912.

The author describes *Certopyge canadensis* n. sp.

This species differs from *C. forficula* Sars in the greater length of the frontal limb of the cranidium, longer palebral lobes and narrower fixed cheeks, etc.

——— Cambrian Geology and Palæontology—2, No. 6. Middle Cambrian Brachiopoda, Malacostraca Trilobita and Merostoma, with plates 24 to 34.

Smithsonian Misc. Coll., vol. 57, No. 6, 1912.

Under the class Malacostraca, the author describes the following species:

Hymenocaris circularis n. sp., *H. obliqua* n. sp., *H. ovalis* n. sp., *H. parva* n. sp., *H. perfecta* n. sp., *H. vermicauda.*

Trilobita: *Neolenus serratus* Rominger. *Ptychoparia cordillerae* Rominger. *Marrella* n. gen., *M. spendens* n. sp.

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WALCOTT (Charles D.)—Continued

Merostomata: *Sidneyia inexpectans* Walc.

Habelia n. gen., *H. optata* n. sp. Emeraldella n. gen., *E. brocki* n. sp., *E. micrura* n. sp. Molaria n. gen., *M. spinifera* n. sp.

Family undetermined. Nathorstia n. gen., *N. transitans* n. sp.

The specific name transitans to this species was given on account of its suggesting a transition between Merostone-like form, such as Molaria spinifera and the trilobites.

Class Crustacea: Order Anostraca—Calman Opabinidae, new family. Opabinia n. gen., *O. regalis* n. sp., *O. media* n. sp. *Leanchoilia* n. gen., *L. superlata* n. sp. Yohoia n. gen., *Y. tenuis* n. sp., *Y. plena* n. sp. Bidentia n. gen., *B. difficilis* n. sp.

Order Notostraca—Calman Naraoidae n. fam. Naraoia n. gen., *N. compacta* n. sp. Burgessidae new fam. Burgessia n. gen., *B. bella* n. sp.

Genus Anomalocaris Whiteaves, *A. gigantea* n. sp.

Waptidae: Waptia n. gen., *W. fieldensis* n. sp.

Hurdia n. gen. *H. victoria* n. sp., *H. triangulata* n. sp.

Tuzoia n. gen., *T. retifera* n. sp.

Odaraia n. gen., *O. alata* n. sp. *Fieldia* n. gen., *F. lanceolata* n. sp.

Carnarvonia n. gen., *C. venosa* n. sp.

Mollisonia n. gen., *M. symmetrica* n. sp., *M. gracilis* n. sp., *M. rara* n. sp.

Tontoia n. gen., *T. kwaguntensis* n. sp.

——— Cambrian Geology and Palæontology—2, No. 8. The Sardinian Cambrian genus Olenopsis in America.

Smithsonian Misc. Coll., vol. 57, No. 8, 1912, with plate 36.

The author describes and figures *Olenopsis zoppii* Meneghini, *O. agnesensis* n. sp., *O. americanus* n. sp., *O. roddyi* n. sp.

Dr. Bornemann distinguishes Olenopsis from Olenus, on account of its having a small, rounded tail shield, with unsegmented axis; by the particularly semicircular outline of the cephalon; the conic, nearly smooth, glabella, and 14 or 15 body segments.

——— Cambrian Geology and Palæontology—2, No. 9. New York Potsdam, Hoyt Fauna, with plates 37-49.

Smithsonian Misc. Collection, vol. 57, No. 9, 1912.

Crustacea:

Ptychoparia minuta Bradley, *P. matheri* n. sp. *Conocephalina whitehallensis* n. sp. *Pagodia seelyi* n. sp. *Agraulos saratogensis* Walc. This species was described as *Bathyurus armatus* Billings (Walcott, 32 Ann. Rep. N. Y. State Mus., p. 131) and as *Ptychoparia (A.) saratogensis* Walcott (Bull. No. 30, U. S. Geol. Sur., p. 21). *Lonchocephalus calcifernus* Walcott, previously described under the genus Conocephalites and Ptychoparia.

The species is closely related to *Lonchocephalus wisconsensis* Owen. It differs in having a relatively shorter frontal limb and longer palpebral lobes.

Ptychaspis speciosus Walcott.

Dicellocephalus Hartti Walcott. This was the *Conocephalites hartti* Walc. (32 Ann. Rep. N. Y. State Mus., p. 130).

The species differs from *Dicellocephalus minnesotensis* in details, but it appears to come within the limits of the genus.

Dicellocephalus tribulis n. sp. allied to *D. misa* Hall.

The author also describes and illustrates several tracks of crustaceans under Owen's gen. Protichnites. The author remarks that the particular trilobite that left tracks on the beaches of Potsdam sandstone time were undoubtedly species of the genus Dicellocephalus.

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WALCOTT (Charles D.)—Continued

The author does not consider Climactichnites as the trail of a trilobite.

He describes *Protichnites septemnotatus* Owen and *P. Logananus* Marsh.

The author remarks that many of the impressions made by Protichnites tracks were trifid, and made by a crustacean having legs terminating in a joint that had three strong, narrow terminal spines.

On plate 45, the author illustrates *Neolenus serratus* from Burgess Pass, in which figure 4 shows the trifid arrangement of the short, strong spines of the terminal joint of the cephalic legs.

——— Cambrian Geology and Palæontology—2, No. 11. New Lower Cambrian subfauna.

Smithsonian Misc. Coll., vol. 57, No. 11, 1913.

The author describes from Robson Peak District the following new species of Crustacea:

Holmia macer n. sp. The species resembles *Holmia Kjerulfi*, but differs in details of the head and thorax.

Wanneria occidens n. sp. The species differs from *Olenellus Gilberti* in its small, short, palpebral lobe and strong marginal rim; also in the presence of an occipital spine.

Callavia eucharis n. sp. The species has 23 segments in the thorax.

Callavia perfecta n. sp. This species has 17 thoracic segments. It differs from *C. crosbyi* in having a more tapering glabella, smaller palpebral lobes, and in the absence of a strong occipital spine.

Olenellus Truemani n. sp. This species differs from *O. Thompsoni* in having shorter palpebral lobes and eyes, and smaller and shorter plural lobes of the third thoracic segment.

——— The Cambrian faunas of China.

Carnegie Inst., vol. 3, Aug. 1, 1913, 375 pp. and 29 plates.

The Trilobites are described and illustrated on pp. 99-228, pls. 1-24. Genus Agnostus Brongniart.

Agnostus chinensis Dames, very much like *Agnostus Pic Aoraghi*, 1902, p. 5, pl. 1, f. 28. *A. douvillei* Bergeron. The author places *A. koerferi* Monke, 1903, as a syn., *A. kushanensis* Walcott, *A. parvifrons latelimbatus* Lorenz, *A.* sp. undt.

Genus Microdiscus Emmons.

Microdiscus orientalis Walcott. The author remarks that the head and the occipital spine are much like those of *M. convexus* Walc. The transverse furrow of the glabella recall those of *M. speciosus* Ford.

Genus Redlichia Cossmann, 1902, to replace Hoeferia Redlich, 1901.

The author places the *Olenellus Forresti* Foord, Geol. Mag., Dec. 3, vol. 7, 1890, p. 99, pl. 4, figs. 2, 2a-b, under this genus.

Redlichia chinensis Walcott, differs slightly from the type. *R. noetlingi*, Redlich, 1901.

R. finalis Walcott, *R. nobilis* Walc., *R.* sp. undt. three species.

Genus Albertella Walcott, 1908.

Albertella pacifica Walcott.

The author compares the pygidium of this species with *A. bosworthi* Walc. and *Paradoxides desideratus* Barrande.

The genus Dorypyge Dames, 1883.

The author does not include Olenoides Walc., under the genus Dorypyge, remarking that it differs in the glabella expanding toward the front, while that of Dorypyge

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WALCOTT (Charles D.)—Continued

contracts in front of the pits in the dorsal furrow; also that the pleural lobes of the pygidium of Olenoides have broad, shallow furrows, with sharp, narrow ridges separating them; while those of Dorypyge have narrow furrows, with broad, rounded ridges between them. Type *D. richthofeni Dames*, 1883.

Dorypyge bispinosa Walc., *D. richthofeni* Dames, *D. richthofeni laevis* Walc.

Genus Teinistion Monk, 1903.

The genus is characterized by the peculiar glabella, narrow frontal margin and spinose pygidium. Type *T. lansi* Monke.

Teinistion alcon Walc., *T. lansi* Monke, *T. sodeni* Monke, *T. typicalis* Walcott, described under the genus Dorypygella by Walcott, 1905.

Genus Stephanocare Monke, 1903, syn. Damesella Chione Walcott, 1905.

Stephanocare Monkei Walcott, *S. richthofeni* Monke, syn., *D. chione* Walc., *S. sinensis* Bergeron, *S.* sp. undt.

Genus Blackwelderia Walcott, 1906.

The genus differs from Teinistion in the character of the associated free cheeks and pygidia, and the frontal limb of the cephalon; from Dorypyge in the form of the glabella and free cheeks. The thoracic segments are alike in the two genera, and the pygidia are of the same type.

Blackwelderia alastor Walc., described under Dorypygella in 1905, *B. cilix* Walc., described under Olenoides ? in 1905, *B. sinensis* Bergeron described under Calymmene ? in 1899.

Genus Damesella Walcott, 1905. Type *D. blackwelderi* Walc.

The author remarks that in Damesella and Stephanocare the facial suture cuts the posterior lateral margin outside of the genal angle, so as to leave the genal angle on the fixed cheeks, and at the same time the spine, corresponding to the genal spine in other genera of the order Proparia, on the free cheek, so Beecher's classification should be modified in relation to the exceptions made in these genera.

Damesella bellagranulata Walc., *D. blackwelderi* Walc., *D. brevicaudata* Walc., *D.* sp. undt.

Genus Drepanura Bergeron, 1899, Genotype *D. premesnili* Berg.

Drepanura ketteleri Monke, *D. premesnili* Bergeron. *Ptychoparia* Corda, 1847.

In this memoir the genus is restricted to species having the characteristic of *Ptychoparia striata* Emmrich.

Ptychoparia axlis Walc., *P. granosa* Walc., *P. impar* Walc. and var., *P. kochibei* Walc., *P. ligea* Walc., *P. lilia* Walc., *P. tolus, P. typus* Dames.

Subgenus Ptychoparia (Emmrichella) Walcott, 1911.

Genotype *Ptychoparia theano* Walc.

The subgenus differs from the following genera:

1. Ptychoparia in its smooth glabella and larger palpebral lobe.
2. Liostracus in having an arched or nearly flat frontal limb and rim and more convex cranidium.
3. Conokephalina in its smoother glabella and wider fixed cheeks.
4. Anomocare in its smoother glabella and distinct palpebral ridge, and proportionately shorter eye-lobes and glabella.

The author described under this subgenus the following species:

Ptychoparia (Emmerichella) bromus Walc., *P. (E.) constricta* Walc., *P. (E.) eriopia* Walc., *P. (E.) mantoensis, P. (E.) theano* Walcott.

Genus Liostracus Angelin, 1854. Genotype *L. aculeatus.*

Two species which the author classes under the subgenus Emmrichella—*mantoensis* and *constricta*—approach most nearly to the genus Liostracus.

Genus Conokephalina Brögger, 1886. Genotype *C. ornatus* Brögger, 1877.

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WALCOTT (Charles D.)—Continued

The genus occupies an intermediate position between Dikelocephalus and Ptychoparia, characterized by its elongated palpebral lobes, narrow free cheeks and elongated glabella, narrowing more or less slightly towards the broadly rounded front.

The Chinese species are: *Conokephalina vesta* Walc., *C. belus* Walc., *C. dryope* Walc., *C. maia* Walc. and *C.* sp. undt.

Genus Crepicephalus, Owen, 1852. Genotype *C. Iowensis* Owen.

Crepicephalus damia Walc. This species, which is nearly related to *C. Iowensis*, differs by the form of the frontal limb and rim of the glabella and other details.

C. convexus Walc. and *C. magnus* Walc.

Genus Lonchocephalus Owen, 1852. Genotype *L. hamulus* Owen.

The author refers the *Ptychoparia tellus* Walc., 1905, to this genus.

Genus Liostracina Monke, 1903. Genotype *L. krausei* Monke.

Genus Proampyx Frech, 1902. Genotype *Anomocare acuminatum* Ang.

Walcott remarks that Dr. Frech appears to have overlooked the fact that the spine of the genus Ampyx is a spinose extension of the front of the glabella, while the nasute projection of the frontal rim of *Anomocare acuminatum* is from an entirely different division of the head.

Proampyx burea Walc.

Genus Pterocephalus Roemer, 1852. Genotype *P. sancti-sabae* Roemer.

The author describes *Pterocephalus asiaticus* Walc., *P. busiris* Walc. and *P. liches* all from fragments of the head and tails.

Genus Shantungia Walcott, 1905. Genotype *S. spinifera* Walc.

The genus is characterized by the large palpebral lobes, nearly smooth truncato-conical glabella, and the long, spinose extension of the front, which is unlike that of Ampyx, as the latter proceeds from the glabella; while the spine of Shantungia is from the frontal rim, in the same manner as that of *Proampyx acuminatum* Ang., but differs in the character of the glabella and palpebral lobes.

The only species described is that of the type.

Genus Inouyia Walcott, 1911.

The species referred to this genus have a swollen, tumid frontal limb; small palpebral lobes; a convex subrectangular glabella; strong dorsal furrows about the glabella, and marked glabellar furrows.

Genotype *Agraulos Capax* Walc., 1906. In addition to the type the author describes *Inouyia abaris* Walc., *I. ? acalle* Walc., *I. ? armata* Walc., *I. divi* Walc., *I. ? inflata* Walc., *I. melie* Walc., *I. ? regularis* Walc., *I. thisbe* Walc. and *I. titiana.*

Genus Agraulos Corda, 1847.

The author refigures the type of the genus and describes the following:

Agraulos abrota Walc., *A. dirce* Walc., *A. dolon* Walc., *A. dryas* Walc., *A. nitida* Walc., *A. obscura* Walc., *A. sorge* Walc., *A. uta* Walc. and *A. vicina* Walc.

Genus Pagodia Walcott, 1905. Genotype *P. lotos* Walc.

The author remarks that the genus differs from Dolichometopus and from the type in the narrowing instead of widening of the glabella in front, in the presence of small instead of large eye-lobes, short instead of long postero-lateral limbs and obscure glabella furrows.

The species referred to this genus are *Pagodia bia, P. dolon, P. lotos* and *P. macedo* Walcott.

Genus Lisania Walcott, 1911. Genotype Anomocarella ? bura Walc.

The species referred to the genus are all small, represented by cranidia and associated free cheeks and pygidia.

Lisania agonius Walc., *L. ajax* Walc., *L. alala* Walc., *L. belemus, L. bura* Walc. and *L.* cf. *bura* Walc.

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WALCOTT (Charles D.)—Continued

Genus Solenopleura Angelin, 1854.

Walcott figures pl. 17, figs. 12, *Solenopleura holometopa* Angelin for comparison, and describes as new the following species:

Solenopleura agno Walc., *S. beroe* Walc., *S. chalcon* Walc., *S. intermedia* Walc., *S. pauperata* Walc., *S.* sp. undt.

Genus Chuangia Walcott, 1911. Genotype *Ptychoparia batia* Walc.

The genus proposed for a group of Upper Cambrian Trilobites in which the cephalon has a truncato-conical or subquadrangular glabella; a narrow concave frontal limb and smooth test.

Three species are described: *Chuangia nitida, C. mais* and *C. framenta.*

Genus Menocephalus Owen, 1852.

Doctor Owen proposed this genus for Trilobites having a highly convex hemispherical glabella, with a narrow border and broadly rounded front cheeks, tumid surface pustulate.

The genotype of Menocephalus was destroyed by fire many years ago.

Dr. Walcott does not include in the genus the species described by Billings under the names of *Menocephalus sedgwicki* and *M. glabosus,* which he refers to Solenopleura, and remarks that *M. salteri* Devine, is the type of an undescribed genus.

The author describes *Menocephalus abderus,* the *Solenopleura abderus* Walc., 1905, *M. acanthus* Walc. (*Solenopleura acantha* Walc. 1905), *M. acerius* Walc., *M. acidalia* (*Solenopleura acidalia* Walc., 1905), *M. acis* Walc. and *M. admeta* Walc., *M. agave* Walc., *M. depressus* Walc., *M.* sp. undt.

Genus Levisia Walcott. Genotype *Agraulos agenor* Walc.

In this genus the cranidium is strongly convex, glabella truncato-conical, tumid and with only a trace of glabella furrows; occipital ring narrow, at the sides broadening rapidly toward the center, convex and extending backward into an obtuse spine; frontal limb narrow; fixed cheeks tumid, one-half as wide as the glabella and with small palpebral lobes midway of their length; postero-lateral limbs rather short and marked by deep, narrow intermarginal posterior furrow, that separates a narrow, rounded margin. The author describes *Levisia adrastia* Walc. (under the genus of Menocephalus Walc., 1905), *Levisia agenor* Walc. under the genus Agraulos Walc., 1905) and *Levisia nasuta* Walc., *Levisia richardsoni* Walc. The last two species are from the Upper Cambrian at Point Levis, Canada.

Genus Ptychaspis Hall, 1863. Genotype *Dikelocephalus miniscoensis* Owen.

The author describes from China, *Ptychaspis baubo* Walc., *P. bella* Walc., *P. brizo* Walc., *P. causu* Walc., *P. cadmus* Walc., *P. calchas* Walc., *P. callisto* Walc., *P. calyce* Walc., *P. campo, P. ceto* Walc. and *P.* sp. undt. Walc.

Genus Anomocare Angelin, 1854. Genotype *A. laeve* Ang.

The author describes fourteen species under this genus, all new except three species, which he refers to Dames.

Anomocare alcinoe, A. convexa, A. daulis, A. ephori, A. flava, A. latelimbatum Dames, *A. lisani, A. megalurus* Dames, described under the genus Liostracus; *Anomocare minus* Dames, *A. nereis* Walc., described in 1906 under the genus Ptychoparia, *A. subquadratum* Dames (*Concephalus subquadratus* Dames), and Anomocare sp. undt. several forms.

Genus Anomocarella Walcott, 1905. Genotype *A. chinensis* Walcott.

This genus differs from Anomocare in the absence of glabella furrows and the presence of a relatively narrow flattened frontal rim, etc.

The author places twenty-two species under this genus.

Anomocarella albion, A. baucis, A. bergioni, A. bigsbyi, A. biston, A. butes, A. chinensis, A. comus (*Ptychoparia comus* Walc., 1906), *A. hermias, A. irma, A. macar,*

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WALCOTT (Charles D.)—Continued

A. smithi, A. speciosa Lorenz (described by Lorenz under the genus Anomocare). Anomocarella *subrugosa* Walc. *(Ptychoparia (Liostracus) subrugosa* Walc., 1906).

Anomocarella tatian Walc., *A. temenus* Walc., *A. tenes* Walc. *(Ptychoparia tenes* Walc., 1905), *A. thraso* Walc., *A. toxes,* Walc., *A. tutia, A. undata* Walc.

The last five species were described by Walcott in 1905, and six under the genus Ptychoparia.

Genus Cossia Walcott, 1911. Genotype *C. superba* Walc.

The author refers to his type for the generic description, and includes five species under the genus.

Coosia bianos, C. carme, C. daunus, C. decelus.

All previously described in 1905 under Anomocare, except *Coosia carme,* which was originally included under Anomocarella.

Coosia robusta and *C. superba* Walcott.

Genus Dolichometopus Angelin, 1854. Genotype *D. svecicus* Ang.

Walcott places Amphoton Lorenz, 1906, as a syn.

The author describes five species from China.

Dolichometopus alceste Walc., *D. deois* Walc., syn. *Bathyriscus asiaticus* Lorenz and *Amphoton steinmanni* Lorenz, *D. derceto* Walc., *D. dirce* Walc., *D. hyrie* Walc.

Genus Hysterolenus Moberg, 1898.

The author only includes one species, Hysterolenus ? sp. undt.

Genus Bathyuriscus Meek, 1873.

Bathyuriscus manchuriensis Walc.

Genus Asaphiscus Meek, 1873.

Asaphiscus iddingi Walc.

Genus Illaenurus Hall, 1863.

Illaenurus canens Walc., *I. ceres, I. dictys* Walc.

Ostracoda:

Genus Aluta Matthew.

The author includes under this genus six species previously described under the genus Bradoria.

Aluta bergeroni Walc., *A. enyo* Walc., *A. eris* Walc., *A. fragilis* Walc., *A. sterope* Walc., *A. woodi* Walc.

Merostoma.

Genus Amiella Walcott, 1911.

Amiella yunnanensis Mansuy (MSS.).

——— Cambrian Geology and Palæontology—2, No. 13. Dikelocephalus and other genera of the Dikelocephalinae.

Smithsonian Misc. Collections, vol. 57, No. 13, 1914.

The author includes under the family Dikelocephalina Beecher, 1897, the following genera:

Dikelocephalus Owen, 1852.

Referring to the restricted genus the following species:

Dikelocephalus minnesotensis Owen, and a variation *D. dalyi* n. sp. The palpebral lobe of *D. dalyi* is shorter than in typical Dikelocephalus, in this respect, resembling some species of Anomocare, but not the typical species *Anomocare laeve* Angelin, *D. Texanus* n. sp.

Dikelocephalus hartti Walcott. This is the *Conocephalutes hartti* Walc., 1879.

D. limbatus Hall, *D. tribulis* Walc., 1912, and *D. vanhornei* n. sp. The cranidium is much like the genotype, but it has a shorter glabella and wider fixed cheeks.

2. Conokephalina Brögger, 1886, genotype *C. ornatus* Brögger.

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WALCOTT (Charles D.)—Continued

Walcott refers *Dikelocephalus misa* Hall to this genus. The other species referred by Brögger to the genus, such as *Dikelocephalus osceola* Hall, are referred by Walcott to a new genus Osceolia, and *Dikelocephalus spiniger* to the new genus Calvinella.

3. Saukia, new genus. The genus has a narrow frontal border about the cephalon, and a glabella proportionately more elongated than in Dikelocephalus. The pygidium is less expanded and more elongate than that of Dikelocephalus. Genotype *Dikelocephalus lodensis* Whitf.

The author describes *Saukia coloradoensis* n. sp., *S. crassimarginata* Whitfield, 1882, *S. fallax* n. sp., *junia* n. sp., *S. leptaenarum* Wiman, 1907; *S. leucosia* n. sp., *S. lodensis* Whitf. the type *S. marica* Walc., 1886; *S. pepinensis* Owen, 1852; *S. pyrene* n. sp., *S. rustica* n. sp., *S. stosei* n. sp., *S. wardi* n. sp.

4. Osceolia, new genus. This genus is characterized by its concave frontal limb, palpebral lobes, narrow fixed cheeks and transverse pygidium with its anterior segment extended beyond the margin as a long spine. Genotype *Dikelocephalus oseola* Hall, 1863.

5. Calvinella, new genus. Genotype *Dikelocephalus spiniger* Hall, 1863. This genus is like Saukia, but differs in form of the glabella, presence of strong occipital spine, and proportionally more elongated pygidium. It differs from Osceola in frontal limb of cephalon, presence of occipital spine and character of pygidium.

The author refers to the genus *Dikelocephalus newtonensis* Weller, 1903; *Calvinella ozarkensis* n. sp. *Dikelocephalus spiniger* Hall, 1863, and *Calvinella tenuisculpta* n. sp.

——— Cambrian Geology and Palæontology, Part 3, No. 1. The Cambrian faunas of Eastern Asia.

Smithsonian Misc. Coll., vol. 64, No. 1, 1914.

The author gives a historical review with a summary of the genera and species.

A new genus, Tsinania, with *Illaenurus canen* for the genotype, is given on page 43. The genus differs from Illaenurus Hall, in having the cranidium rounded in front, by the incurving of the facial sutures, and short postero-lateral limbs. He refers several species to the new genus previously included under Hall's genus, viz: *Tsinania canens, T. ceras, T. cleora* and *T. dictys.*

——— Cambrian Geology and Palæontology, No. 3. Cambrian Trilobites.

Smithsonian Misc. Coll., vol. 64, No. 3, 1916.

The author, under the Order Proparia, describes several new genera.

Family Menomonidae—Menomonia a new genus with *Conocephalites, calymenoides* Whitfield as the genotype.

Millardia, a new genus with *M. semele* as genotype. Refers one new species *M. avitas* and *Conocephalites optata* Hall, also, to the genus.

Dresbachia, a new genus with *D. anata* as the genotype.

Norwoodidæ, a new family with a new genus, Norwoodia, with five new species: Genotype *N. gracilis*, also *N. ponderosa, N. Saffordi, N. simplex* and *N. tenera.*

The cranidium, with its Ptychoparia-like glabella and small eyes and broad pleural furrows, are primitive, while the few thoracic segments (8 or 9) and relatively large tail, suggests the sub-family Phacopinae. Under the order Opisthoparia, he describes *Agraulos stator* n. sp.; also Acrocephalites Wallerus, with a translation of that author's description of the genus, with nine new species. Refers *Solenopleura ? stenometopa* Ang. and *Conocephalites vulcanus* Bill. to the genus.

Compares the new species *A. Haynesi* and *tutus* with the genotype, *Acrocephalites insignis* has narrower fixed cheek and frontal limb of *A. stenometopus, A. Americanus*

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WALCOTT (Charles D.)—Continued

is a larger species than the genotype. *A. aster* has a frontal boss much like the type. *Acrocephalites multisegmentus* has 25 thoracic segments. *A. aoris,* a species much like *A. tutus;* also *A. glomeratus,* a species like *A. ? majus.*

The author describes seven species under Lorenz's genus Alokistocare, of which *A. althea, A. ? labrosun, A. pomona* and *A. ticida* are new. He refers *Ptychoparia ? Linnarssoni* and *P. ? prospectense* to the genus, and includes a figure and description of the genotype *Conocephilites subcornatus* Hall and Whitfield, which he compares with the new species *A. althea.*

The author includes under the genus Lonchocephalus eight species, five of which are described as new: *Lonchocephalus appalachia, L. bunus, L. pholus, L. plena, L. sospita.*

Describes and illustrates the genotype *L. Chippewaensis* Owen. Refers Shumard's *Conocephalites minor* and *C. minutus* Bradley to the genus.

Dr. Owen, plate 1-A, fig. 15, Geol. Sur. Wis., Iowa and Minnesota, 1852, p. 624, refers to Lonchocephalus ? a pygidium with lateral spines, similar to *Dikelocephalus Iowensis,* which Walcott places as the genotype of Crepicephalus.

The author remarks that Lonchocephalus is most nearly related to Liostracus Angelin, with only the cranidium for comparison. The difference between them is in the frontal limb and rim, and the absence of well-defined glabella furrows in Liostracus.

The author uses the *Conocephalites calciferous* for the genotype of a new genus Saratogia, placing under it six species, four new: *S. arses, S. aruno, S. hera* and *S. volux,* with *Crepicephalus Wisconsensis* Owen; including as syn. *Dikelocephalus latifrons,* described by Hall, also by Shumard, under this genus.

In the family Ceratopygidae, genus Crepicephalus Walcott (not Owen), the author includes some 20 species.

Walcott uses *Dikelocephalus ? Iowensis* Owen, for the genotype.

Owen's genus, as the name implies, was for a slipper-shaped, tapering glabella, a true Ptychoparia species, which Corda named in 1847. Dr. Owen used the term Dikelocephalus for the mattock-shaped heads, and refers to Dikelocephalus such species as Walcott genotype, although Owen referred to Lonchocephalus, a form like *Crepicephalus Iowensis* Walcott, on p. 624, pl. 1-A, fig. 15.

Lonchocephalus might replace in part Anomocare, and Crepicephalus be referred to Lonchocephalus for Owen's Lonchocephalus, p. 624, pl. 1-A, fig. 15.

Walcott divides the pygidae into two groups:

1. The *Crepicephalus Iowenis* group.

In which the postero-lateral margins of the pygidium extend backward on each side from a broad base into a sharp, narrow spine. Test nearly smooth. Upper Cambrian.

2. *Crepicephalus Texanus* group.

In which the postero-lateral spines are long, slender, and attached to the side of the pleural lobe above the margin. Test granulated. Lower Cambrian.

The author describes and figures *Crepicephalus angusta, C. camiro, C. comus, C. cossensis, C. coria, C. dis, C. Iowensis* (Owen) *A. Liliana, C. Texanus* (Shumard) var. *danace* and *elongatus, C. thoosa, C. tripunctatus* (Whitfield) also var. *magnispinus, C. tumidus, C. unca, C. unzia, C. upis,* and two doubtful species.

Under the Family Oryctocephalidae, the author includes the new genus Vanuxemella. This genus, represented by *V. contracta* and *V. nortia,* from the Lower Cambrian, has a simple form, with some features suggesting Albertella. It differs in absence of glabellar furrows, shorter eye lobes, absence of prolonged third segment of thorax, with only four thoracic segments. The long spines of the tail spring from about the fifth segment, while in Albertella they appear to be the extension of the first or second anterior segment.

Walcott includes under his genus Karlia the genotype *K. minor* and *Menocephalus*

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WALCOTT (Charles D.)—Continued

Salteri ? Rominger, which he refers to *Karlia Stephensis.* Dr. Matthew, 1899, refers the genus to Dorypyge, and the species to *Dorypyge Dawsoni.*

The author describes a new genus Hanburia with its genotype *H. gloriosa.* Remarks the large pygidium and few thoracic segments suggest the order Opisthoparia and family Asaphidae. From Burgess Pass above Field, B. C.

Under Tsinania, the *Illaenurus canens* Walc., as the genotype, Walcott, includes the new species *T. cleora* and *T. elongata.*

Plate 38 gives figures of *Wanneri Walcottana,* figs. 1 and 2.

——— Cambrian Geology and Palæontology—3, No. 5. Cambrian Trilobites.

Smithsonian Misc. Collections, vol. 64, No. 4, pp. 303-456, plates 45-67, 1916.

The author describes and illustrates the following Cambrian Trilobites:

Corynexochus bornholmiensis Grönwall, *C. brennus* Walc., *C. bubaris* Walc., *C. capito* Walc., *C. clavatus* Walc., *C. delagei* Miquel., *C. minor, C. senectus* (Billings), *C. spinulosus* Ang., *C. stephenensis* (Walc.).

Refers *Corynexochus romingeri* Matt. to *C. stephensis, Corynexochus ? umbonatus* Angelin to the genus Æglina.

The new subgenus Bonnia is proposed as a subgenus to Corynexochus, with *Bathyurus parvulus* as the genotype.

The author includes *Corynexochus (Bonnia) busa* nov., *C. (Bonnia) fieldensis,* the *Protypus fieldensis* Walcot, 1908.

Corynexochus (Bonnia) parvulus the *Bathyurus parvulus* Billings, 1861.

Sub-family Dolichometopinae.

Bathyuriscus adaeus nov., *B. anax* nov.

The *Bathyuriscus productus* (H. & W.) Walc., in part, 1886, Bull. U. S. Geol. Sur., No. 30, pl. 30, fig. 1, 1a, 1b, 1g and 1h.

Bathyuriscus atossa nov., *B. bantius* nov., *B. batis* nov., *B. belesis* nov., *B. belus* nov., *B. ? bithus* nov., *B. Haydeni* Meek, *B. Howelli* Walc., *B. Manchuriensis* Walc., *B. ornatus* Walc., *B. rotundatus* Rominger, *B. Stoliczkai* Reed, *B.* sp. undetermined, Nos. 1 and 2.

Bathyuriscus (Poliella) new subgenus.

Most of the species of Poliella are small, with from seven thoracic segments to eleven segments and a small pygidium.

The genotype *Bathyuriscus (Poliella) anteros* Walcott.

The author includes eight species under the subgenus: *Bathyuriscus (Poliella) anteros* nov., *B. (P.) powersi, B. (P.)occidentalis* nov., *B. (P.) primus, B.* (*P.*) *caranus* nov., *B. (P.) sylla, B. (P.) balus* nov., *B. (P.) probus.*

Dolichometopus.

Dr. Walcott refers eleven species to this genus: *Dolichometopus acadicus* Matt., *D. ? alceste* Walc., *D. baton* Walc., *D. ? bessus* Walc., *D. bion* Walc., *D. boccar* Walc., *D. ? deois* Walc., *D. ? derceto* Walc., *D. ? dirce* Walc., *D. ? expansus* (Walc.), *D. productus* (H. & W.), *D. suecicus* Ang., *D. tontoensis* Walc.

The other species of Dolichometopus, such as *Dolichometopus ? convexus* Billings, referred to Bolbocephalus, *D. ? gibberulus* Bill., to Platycolpus, *D. hyie* Walc., to Anomocare, *D. occidentalis* Matt. to Bathyuriscus, *D. ? rarus* Bill. to Bolbocephalus, *D. tatei* Woodw. to Redlichia.

The author forms a new subgenus, for certain species with a small palpebral lobe, that lack genal spines on the free cheek, with *Dolichometops (Housia) varro* Walcott as the genotype.

Family Asaphidae, sub-family Ogygiocarinae.

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WALCOTT (Charles D.)—Continued

Ogygopsis Klotzi (Rominger).

Orria new genus, with *Orria elegans* Walcott, as the genotype. Both Orria and Ogygopsis suggest a stage of development between Bathyuriscus and Ogygiocaris. The form is Ogygopsis-like, but differs in that the cephalon is smaller in proportion to the thorax and the pygidium; fixed cheeks nearly absent between palpebral lobes and glabella; palpebral lobes large and close to glabella; postero-lateral limbs long and narrow antro-lateral limbs; only a narrow space between the glabella and facial sutures; pleural grooves of thorax segments broad and straight, instead of narrow and diagonal.

Asaphiscus the author refers to the genus.

Asaphiscus calenus Walc., *A. camma* Walc., *A.? capella* Walc., *A.? granulatus* Walc., *A. Iddingsi* Walc., *A.? minor* Walc., *A.? unispinus* Walc., *A. Wheeleri* Meek, the genotype; also *A. agatho* Walc., *A.? anaxis* Walc., *A. calanus* Walc., *A.? duris* Walc., with three sp. undt., and *A.? florus* nov.

Blainia new subgenus.

The species referred to Blainia have nine thoracic segments and from six to eleven distinct anchylosed segments in the pygidium. Genotype *Asaphiscus (Blainia) gregarius* Walc.

Dr. Walcott includes four new species under the subgenus:

Asaphiscus (Blainia) elongatus, A. (B.) glabra, A. (B.) paula.

Blountia new genus.

The author refers seven species to this genus. Genotype *Blountia minula* Walc., *Blountia? alemon* Walc., *B. alethes* Walc., *B. alexas* Walc., *B. amage* Walc., *B. andreas* Walc., *B. anser* Walc., and *B. mimula* from the Upper Cambrian.

Maryvillia new genus. Genotype *M. Arion* and *M. Ariston* nov.

The pygidia associated with the cranidae of these species are elongate, with about fourteen segments, which suggest transition from Blountia to Tsinania, as represented by such species as *Tsinania canens* Walc., etc.

Family Olenidae: Marjumia new genus. Genotype *M. typa* Walc.

This genus appears to unite characters found in several genera. The cephalon is essentially that of Asaphicus, the thorax that of Ptychoparia, and the pygidium that of *Peltura scaraboides* and *Parabolina megalops.*

In addition to the type the author describes *Marjumia callas* nov. Lisania Walc. genotype *Anomocarella bura* Walc. and *L.? breviloba* nov.

Illaenurus quadratus Hall.

Mesonacis Gilberti Meek.

Proparia, Family Eodiscidae: Pageti new genus. Genotype *P. bootes* Walc. The new genus was proposed for the forms of Eodiscidae, in which the eye, the free cheeks and facial sutures are developed. Two species described *Pagetia bootes* and *P. clytia.*

——— Cambrian Geology and Palæontology IV, No. 2. The Albertella fauna in British Columbia and Montana.

Smithsonian Misc. Coll., vol. 67, No. 2, 1917, May 9, 1917.

The author describes from this formation the following Crustacae:

Agraulus stator Walc.

Ptychoparia candance nov.

The elongated body and small pygidium suggest *Agraulos stator,* but the cranidium is that of Ptychoparia, and there are 16 thorax segments, while *A. stator* has 22, a middle Cambrian form.

Ptychoparia? charax nov.

This species is probably a subgenus with a Ptychoparia-like cranidia, with a broad concave frontal border and rim, that will undoubtedly be placed in a subgenus.

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WALCOTT (Charles D.)—Continued

Ptychoparia ? cilles nov. *P. pylas* nov., from Gordon Creek, Montana.

Crepicephalus chares nov., related to *C. camiro.*

Vanuxemella nortia Walc. *Olenopsis* cf. *Americanus* Walc.

Albertella Boswworthi Walc., *A. Helena* Walc., *A. levis* nov.

Zacanthoides charilla nov. compares *Z. idahoensis Z. ? cimon* nov., *Z. cnopus* nov., the thorax has the great median spine on the 8th segment instead of the 5th as in *Z. Idahoensis.*

Neolenus constans nov.

Bathyuriscus Rossensis nov., characterized by the very much produced genal spines extending backwards to the pygidium.

Bathyuriscus cf. *Rossensis* nov. The glabella is longer and more slender proportionally than that of *Rossensis.*
but differs in many details.

Bathyuriscus (Poliella) chilo nov.

Differs from *B. (P.) sylla* of the Chetang formation in the nearly straight sides of the glabella, and narrower and shorter associated pygidium. Related to *B. (P.) primus,*

Wallereus (Iran D.) Undersokungen ofver zonen med *Agnostus laevigatus* 1. Vestergotland Jämte en inledande ofversikt af Vestergotlands samtliga Paradoxideslager Lund, 1895, 72 pp., plate.

Agnostus laevigatus Dalm. also var. *armata* Linrs., *A. exsculptus* Ang., also forma *sulcifera, integra, Agnostus planicauda* Ang.; also forma *vestgothica, A. pisiformis* Linné *A. fallax* Linrs. forma *ferox* Tulb. and var. *insignis* n. var.

Conocephalus suecicus n. sp.

Acrocephalites stenometopus n. gen. for Angelin's *Solenopleura ? stenometopus.* It is characterized by a suture running inwards to the rim of the head shield in front of the eyes, a pointed front to this shield, and a small knob in front of the glabella.

Liostracus costatus Ang. *Proceratopyge conifrons* n. gen. et sp. This genus, as its name indicates, is the typical species of the Ceratopyge. It differs in its conical glabella, its four pairs of glabella furrows and the triangular front fold of the rim.

Toxotis pusilla n. gen. et sp. This is a remarkable genus, which retains several embryonic or early larval characters, as the narrow glabella, and three swellings on the front of the shield.

Paradoxides sp. *Leperditia primordalis* Linrs. This paper was reviewed by G. F. Matthew, Amer. Geol., vol. 17, 1896, pp. 49-50.

Walther (Karl). Das Unterdevon zwischen Marburg a L. und Herborn Nassau.

Neues Jahrb. Mineralogie, Beil, vol. 17, 1903, pp. 1-75, 4 plates.

Cryphaeus laciniatus F. R., *C. Lethaeae* Kays. *Cryphaeus* sp. *Homalonotus armatus* Burm., *H. gigas* A. Roem., *H. crassicauda* Sandb. *Homalonotus* sp. *Lichas* cf. *Haueri* Barr. *Phacops* sp.

Ostracoda: *Beyrichia strictisulcata* (Sand.) Jones. *Bollia varians* (Sand.) Jones.

——— Beitrage zur Geology and Palæont des älteren Paläoz in Ostthuringen.

Neues Jahrb. für Mineral, etc., 1907, Bd. XXIV.

Ward (J.) Contributions to the geology and palæontology of North Staffordshire, No. vi. Palæontology of the Cheadle Coalfield.

Stone Rep. N. Staff, F. Cl. 40, 1906, pp. 102-137, pl. 2.

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Wanner (Arteus). A new species of Olenellus from the Lower Cambrian of York County, Penn.

Proc. Washington Acad. Sci., vol. 3, 1901, pp. 276-272, plate.

Olenellus (Holmia) Walcottanus n. sp.

Dr. Walcott refers this to his new genus Wanneria.

Wenjukow (P. N.) Die Fauna der Silurischen Ablagerungen des Gouvernments Podolien.

Mater. Geol. Russ, vol. 19, 1899, pp. 21-266, plates 1-9.

Trilobita: *Encrinurus punctatus* Brunn., *E.? obtusus* Ang. *Sphaerexochus mirus* Beyr. *Illaenus (Bumastus) barriensis* Murch., *I. Bouchardi* Barr. *Calymmene tuberculata* Brunn. *Phacops (Acaste) Downingiae* Murch., *P. (Odontochile) caudatus* Brunn. *Proetus concinnus* Dalm. *Eurypterus Fischeri* Eichw.

Ostracoda: *Leperditia tyraica* Schm. *Beyrichia inornata* Alth., *B. idonea* n. sp., *B. Buchiana* Jones, *B. inclinata* n. sp., *B. Reussi* Alth. *Entomis reinformis* n. sp. *Primitia concinina* Jones.

Weller (Stuart). Descriptions of the Cambrian Trilobites from New Jersey, with notes on the age of the Magnesian Limestone series.

Ann. Report Geol. New Jersey for 1899, pp. 47-53, plate.

The species described are *Olenellus Thompsoni* Hall. *Liostracus? jerseyensis* n. sp. Referred to Solenopleura by the author in Palæontology New Jersey, vol. 3, p. 119.

——— Report on the Palæontology of New Jersey.

Geol. Sur. New Jersey, vol. 3, Trenton, 1903, 388 pp., 23 plates.

Cambrian Fauna: Olenellus Thompsoni Hall, *O.* sp. undet.

Ptychoparia Blairi n. sp., *P. Newtonensis* n. sp., *P. calcifera* Walc., *P.* sp. undet. *Agraulos saratogensis* Walc. *Solenopleura jerseyensis* n. sp. *Anomocare parvula* n. sp. *Dikelocephalus newtonensis* n. sp. Referred by Walcott to Calvinella.

Ordovician Fauna: *Asaphus canalis* Whitf. Referred to *Asaphella gryracanthus* by Raymond. *Illaenurus columbiana* n. sp. Referred to *Symphysurus convexus Bathyurus* sp. undet.

Trenton Fauna: *Harpina ottawensis* Bill. Referred to Eoharpes by Raymond. *Trinucleus concentricus* Eaton. *Isotelus gigas* DeKay. *Ptychoparia jerseyensis* n. sp. Referred to *Bathyurus longispinus* Walc., by Raymond. *Bumastus trentonensis* Emm. The author figures the small species described by Emmon under Illaenus, with eight thorax segments. This is taken for the type by Clarke, and described as Bumastus by Billings under the name of *Milleri.* Emmon's *Bumastus trentonensis* is a larger species; referred by Raymond to *Bumastus Billingsi. Bumastus tranversalis* n. sp. and *B. elongatus* n. sp. *Proetus latimarginatus* (name pre-occupied by H. & C.). *Proteus Welleri* nov., *P. brevimarginatus* n. sp. *Cyphaspis trentonensis* n. sp. *Bronteus lunatus* Bill. *Arges tuberculatus* n. sp. *Platymetopus trentonensis* Conrad. *Odontopleura parvula* Walc. *Encrinurus trentonensis* Walc. and *Calymmene senaria* Conrad. *Ceraurus pleurexanthemus* Green. *Pseudosphaerexochus trentonensis* Clarke. *Pterygometopus callicephalus* Hall, *P. intermedius* Walc.

Ostracoda: *Leperditia fabulites* Conrad, *L. ornata* n. sp. *Eurychilina oculifera* n. sp., *E. jerseyensis* n. sp.

Silurian Fauna: *Proetus pachydermatus* Barrett, *P.? depressus* n. sp., *P. spinosa* n. sp. (a doubtful species of Proetus or Phacops). *Calymmene camerata* Conrad. *Dalmanites aspinosa* n. sp.

Ostracoda: *Leperditia altoides* n. sp. *Beyrichia sussexensis* n. sp., *B. Barretti* n. sp., *B.*

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WELLER (Stuart)—Continued

perinflata n. sp., *B. jerseyensis* n. sp., *B. nearpassi* n. sp., *B. deckerensis* n. sp. *Bathocypris nearpassi* n. sp.

Devonian Fauna: *Dalmanites pleuroptyx* Green. *Proetus protuberans* Hall. *Lichas pustulosus* Hall. *Homalonotus Vauxemi* Hall. *Phacops Logani* Hall. *Dalmanites dentatus* Barrett. *Homalonotus DeKayi* Green. *Phacops rana* Green. *Dalmanites* sp. and *D. anchiops* Green.

Leperditia alta Conrad. *Beyrichia Kummelli* n. sp., *B. wallpackensis* n. sp., *B. montaguensis* n. sp., *B. Smocki* n. sp., *B. nanliensis* n. sp. *Leperditia elongata* n. sp., *L. gigantea* n. sp. (pre-occupied for a species by Roemer).

——— The Palæontology of the Niagaran Limestone in the Chicago area—The Trilobita.

Bull. Chicago Acad. of Sciences, No. iv, part 2, 1907, pp. 163-281, plates 16-25.

The author gives classification of the Trilobita and bibliographic list of the species of North American Silurian Trilobita; also a description of the following species:

Harpes Telleri n. sp. *Illaenus insignis* Hall, *I. Harrisi* n. sp., *I. niagarensis* Whitf., *I. armatus* Hall, *I. ioxus* Hall, *I. graftonensis* M. & W., *I. transversalis* n. sp., *I. imperator* Hall, *I. cuniculus* Hall, *I. chicagoensis*, n. sp.

Illaenoides n. gen. Similar to Illaenus, but with the head more strongly trilobed, with longer and stronger dorsal furrows. The eyes are small and situated much farther forward than in Illaenus. Thorax and pygidium as in Illaenus.

Illaenoides triloba n. sp. *Proetus channahonensis* n. sp., *P. Handwerki* n. sp. *Cyphaspis intermedia* n. sp. *Bronteus acamas* Hall.

Lichas: *Corydocephalus phlyctainodes* Green. *Dicranopeltis decipines* W. & M., *D. nasuta* n. sp., *D. Telleri* n. sp. *Metopolichas pugnax* W. &. M., *M. Ferrisi* n. sp.

Arctinurus occidentalis Hall, *A. chicagoensis* n. sp. *Acidaspis Vanhornei* n. sp. *Odontopleura illinoisensis* n. sp. *Ceratocephala goniata* Warder. *Encrinurus Egani* Miller, *E. tuberculifrons* n. sp. *Calymmene niagarensis* Hall. *Ceraurus niagarensis* Hall, *C. Hydei* n. sp. *Sphaerexochus Romingeri* Hall. *Deiphon americanus* n. sp. *Staurocephalus obsoleta* n. sp. *Phacops Handwerki* n. sp. *Dalmanites platycaudatus* n. sp., *D. illinoisensis* n. sp., *D. vigilians* Hall, *D. arkansanus* Van Ingen, *D. verucosus* Hall.

——— Kinderhock faunal studies. The Fauna of the Fern Glen Formation.

Bull. Geol. Soc. Amer., vol. 20, pp. 265-332, pls. 10-15, 1909.

Proetus fernglenensis n. sp.

The author compares this with *Proetus missouriensis*, but that species is proportionately longer, with a glabella which is somewhat broader and subtruncate in front.

——— Descriptions of new species of Ordovician fossils from China.

Proc. U. S. Nat. Mus., vol. 32, No. 1549, 1907, pp. 557-563.

The Trilobites described are *Ampyx chinensis* n. sp. *Asaphus blackwelderi* n. sp., *A. asiaticus* n. sp., *A. taningensis* n. sp., *A. laevis* n. sp., *A. chinensis* n. sp. *Megalaspis minor* n. sp. *Illaenus bronteoides* n. sp. These species were afterwards figured in Researches in China, Carnegie Inst. of Washington, vol. 3, 1913.

——— A report on Ordovician fossils collected in Eastern Asia in 1903-04.

Research in China, vol. 3, 1913, pp. 279-294, plates 25-26.

The author describes Ampyx chinensis allied to *A. nasutus* Dalman. Ampyx sp. cf. *A. costatus* Boeck. Bathyurus sp. undt.

Asaphus blackwelderi n. sp. The Chinese species may be distinguished from *A. expanus* Dalman, on account of its obsolete glabella.

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WELLER (Stuart)—Continued

Asaphus taningensis n. sp., *A.* sp. cf. *A. expansus* Dalman, *A. asiaticus, A. laevis* Weller, *A. chinensis* Weller.

The author also describes several species of the Asaphus without identification.

Megalaspis minor Weller. *Illaenus bronteoides* Weller. *Proetus* sp. undt. *Calymmene* sp. undt. *Pterygometopus* sp. undt.

The author remarks, that among the Trilobites the most conspicuous feature in the Chinese fauna is the great variety of Asaphidae belonging to the genera Asaphus, Megalaspis and Isotelus.

Westergärd (A. H.) Index to N. P. Angelin's Palæontologia Scandinavica, with notes, Lund, 1910.

Meddelande från Lund's Geologiska Fältklubb, Ser. B, No. 5.

The author remarks that the first fasciculus of the work, which is printed in quarto and written in Latin, (the copy I have bears no date. Plate 22 was not issued in this edition), but published in Fasc. 2, was issued in 1851 with pp. 1-24, and plates 1-xxiv, under the title, "Palæontologia Svecica."

Lindström's edition, 1878, states that this appeared in 1852.

The second fasciculus, containing plates xxv-xli and pp. 25-92 (or rather pp. 21-92, because the latter part of the third sheet of fasc. 1 was reprinted in essentially altered form), appeared in 1854, when the title of the work was also altered into "Palæontologia Scandinavica," for the evident reason that there are a great number of species from Norway and Bornholm cited in this fasciculus. Pages l-lx were added, containing an account of Silurian stratigraphy, and one page of "Addenda et Corrigenda," besides which plates xx and xxii were enchanged for new ones.

In 1878 the entire work was re-edited by G. Lindström, under the title of "Pars I Iconographia Crustaceorum Formationis Transitionis." In this work facs. 1 and 2 form only the first part of the projected work.

In 1855 Angelin got a public subvention for editing fasc. 3. This was not published, but several of the plates, intended for this fasc. were printed. Two of these plates, A and B, reproductions exclusively of Crustacea, have probably been appended to privately distributed copies of Palæontologia Scandinavica. Some of these plates distributed in some way are cited in literature, Grönwall Danm. Geol. Unders. 11 Raekke, No. 13, p. 107 (note at foot of page), quotes Table XLIII, on which *Paradoxides Davidis* Salter is reproduced under the name *Paradoxides Pingelli* Beck MS.

Before Angelin set to work writing "Palæontologia Scandinavica," he sold collections of Swedish fossils, several of which he had himself named. A list of these collections, embracing five decades, was printed under the title "N. P. Angelini Mus. Pal. suecicum, Sectio prima, Petrefacta formationis s. d. transitionis superiors centuria, 1 ma."

When Angelin in "Palæontologia Scandinavica" cites one of these new species he puts "nob" after the name and not new species.

The notes on pp. 12-48, contain notes and corrections to Angelin's work. Lorenz, since the issue of this Index, has referred *Solenopleura branchymetopus* Ang. to the genus to *Ptychoparia.*

These notes are supplementary to page 1, Occasional Paper iv, Cal. Acad. of Science, 1893.

In a note to the author from Dr. Sv. Leonh. Törnquist, who was a student under Angelin, he remarks, that "as to the plates XLIII-XLV of 'Palæontologia Scandinavica,' Angelin seems himself to have rejected them. Be this as it may, when after the author's death the work was re-edited by the Academy of Science, it was decided that the said plates, owing to their incorrectness, should be maculated, and all the copies were accordingly destroyed, in order to prevent their being cited. Some proof sheet may,

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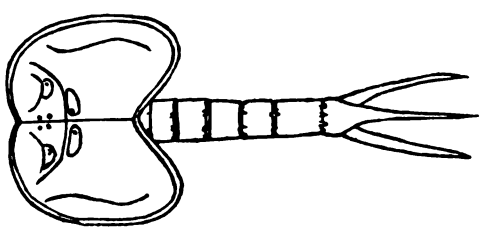
however, have escaped destruction since, and Angelin's memory will certainly be best served if they are not mentioned."

Whitborne (C. F.) Descriptions of the Fossils from the Morte Slates.
Quart. Jour. Geol. Soc. London, vol. 53, 1897, pp. 445-462, plate 31.
Dalmanites (Cryphaerus) laciniatus F. Rom. *Dalmanites* sp. *Homalonotus* sp.

Whiteaves (J. F.) Preliminary list of fossils from the Silurian (Upper Silurian) rocks of the Ekwan River and Sutton Mill Lake. Keewatin collection by D. B. Dowling in 1901, with descriptions of such species as appear to be new.
Report Bureau of Mines, 1912, vol. 21, part 2, pp. 157-168.
Crustacea Isochilinina or Leperditia sp. indet.
Calymmene Niagarensis Hall. *Illaenus* sp. indet. *Bronteus Ekwanensis* sp. nov., *B. aquilonaris* sp. nov. *Ceraurus Tarquinius* Billings.
These species were also described in Geol. Sur. Canada, Ann. Report, new ser., vol. 14, 1901, F. Appendix I, pp. 38-60.

White (David). Fossil Flora of the Coal Measures of Brazil.
Commissäo de Estudos das Minas de Carväo de Pedra do Brazil. Final Report by I. C. White, 1908.
David White describes under the name of *Hastimima whiteri* certain fragmentary remains from the Carbonic plant beds of Santa Catherinia—a doubtful plant, referred by palæontologists to the Eurypteridae as the genus Hastimima White.

Whitfield (R. P.) Contributions to the Palæontology of Ohio.
Geol. Survey Ohio, vol. 7, 1893, pp. 407-494, plates 1-13.
Eurypterus Eriensis Whitf.. *Leperditia alta* Conrad. *Echinocaris sublevis* Whitf., *E. pustulosa* Whitf., *E. multinodosa* Whitf. *Palaeopalaemon Newberryi* Whits. *Aristozoe Canadensis* n. sp.



Echinocaris Punctatus Whitfield

——— Observations on the fauna of the rocks at Fort Cassin, Vermont, with descriptions of a new species.
Bull. Amer. Museum Nat. Hist., vol. 5, 1980, pp. 25-39, plates.
Bolbocephalus Seelyi n. gen. et sp., *B. truncatus* n. sp. *Bathyurus (Bathyurella) planicephalus* n. sp.

——— Notice and description of new species and new genus of Phyllocardæ.
Bull. Amer. Museum Nat. Hist., vol. 7, 1896, pp. 299-304.
Entomocaris Telleri n. gen. et sp. *Ceratiocaris Monroei* n. sp., *C. poduriformis* n. sp.

——— Note on the hypostoma of *Lichas* (*Terataspis*) *grandis*, Hall.
Bull. Amer. Museum Nat. Hist., vol. 9, 1897, pp. 41-42, figures.

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WHITFIELD (R. P.)—Continued

——— and **Hovey** (E. C.) Catalogue of the type and figured specimens in the Palæontological collection of the Geological Department American Museum Natural History.

Bull. Amer. Museum Nat. Hist., vol. xi, 1900, 356 pp.

Williams (H.) assisted by **Breger** (C. L.) The Fauna of the Chapman Sandstone of Maine.

U. S. Geol. Sur. Prof. Papers No. 89, 1916.

The authors describe *Homalonotus laticaudatus* nov., distinguished from *H. delphinocephalus* by its broader pygidium, very much like the Rheinish Devonic sp., *H. crassicaeda* Sandb. *Homalonotus Vanuxemi* Hall. *Phacopidella Chapmani* nov., compares *P. anceps* and *P. mylanderi* Dalmanites ? (Synphoria) a and b sp. nov.

Ostracoda: *Ctenobolbina ? cornuta.*

Zygobeyrichia nov. gen. Genotype *Z. devonica* Jones and Woodward, 1889. The new generic name is proposed for a group of large Beyrichidae that seems to represent a departure from the type from the Silurian stock.

Zygobeyrichia apicalis nov. and *Z. extrema* nov. This is distinguished from *Z. apicalis* by its shorter and more gibbous form; and from species of Kloedenia it differs by the complete loss of the posterior lobe, the greater depth and length of the sulcus and the ventral prolongation, etc.

Williams (N. Y.) An Eurypterid Horizon in the Niagara Formation of Ontario.

Canada Dept. of Mines Mus. Bull. No. 20, Geol. ser. No. 29, 1915, pp. 51, pls. 5.

Wiman (Carl). Studien ueber das Nordbaltische Silurgebiet. 1.

Geol. Instit. Upsala, No. 11, vol. vi, part 1, 1902, with 4 plates and map.

Olenellus sp. *Paradoxides* sp. *Arionellus balticus* n. sp. *Ellipsocephalus latus* n. sp. *Ellipsocephalus* sp.

Aparchites ? Anderssoni n. sp., *A. ? fennicus* n. sp. *Beyrichona gevalensis* n. sp., *B. faba* n. sp., *B. ? alta* n. sp. *Ostracod* sp. *Sellula fallax* n. sp. *Bradorona nitida* n. sp. *Indiana ? minima* n. sp. *Hipponicharion Matthewi* n. sp.

Acerocare norvegicum Mbg. *Geratopyge forficula* Sars. *Shumardia oelandica* Mbg., *S. bottnica* n. sp. *Trilobite.*

The author gives a bibliography of the literature on the Baltic Silurian, with quotations and figures from Roberg's Dissertatio academica de fluviatili astaco ejusque usu medico, Upsala, 1715, p. 32; and refers his figure 1 to *Megalaspis limbata* Sars and Boeck; figure 2 to the pygidium of an *Asaphus.*

——— Ein Shumardiaschiefer dei Lanna in Nerike.

Arkiv. for Zoologi K. Svenska Vet. Ak. ad Stockhölm, Bd. 2, No. 11, 1905.

Apatocephalus pecten n. sp. *Megalaspis planilimbata* Ang., *M. nericiensis* n. sp. *Niobe laeviceps* Dalm. *Niobe* sp. Nos. 1 and 2. *Symphysurus breviceps* Ang. *Ampyx brevicauda* n. sp. *Agnostus glabratus* Ang., *A. glabratus* Ang. var. *ingricus* Fr. Schmidt, *A. lentiformis* Ang., *A.* sp. *Shumardia nericiensis* n. sp. *Orometopus* sp.

Wilson (Alice E.) and **Mather** (Kirtley F.) Appendix 11. Synopsis of the common fossils of the Kingston area.

25th Ann. Rep. Ontario Bureau of Mines, 1916, pp. 45-66, plates 1-3.

The authors illustrate as Black River fossils, Ordovician species. *Bumastus Milleri* (Bill.) and *Isotelus gigas* DeKay. *Bathyurus extans* Hall. *Onchometopus simplex* R. & N.

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Ostracoda:

Isochilina armata Walc. *Leperditia fabulites* Conrad and *L. tumida* Ulrich.

Trenton Fossils:

Calymmene senaria Conrad. *Ceraurus dentatus* R. & B. and *Isotelus gigas* DeKay.

***Wood.** On the classification of Trilobites. (Not seen.)

The Cambridge Natural History, vol. 4, 1909.

Wood (Elvira). Marcellus (Stafford) Limestone Erie County, N. Y.

Bull. New York State Mus., No. 49, 1901, pp. 139-181.

Phacops rana Green. *Cryphaerus Boothi* Green, *C. craspedota* Hall. *Primitopus punctulifera* Hall.

Woods (Henry). The Cambridge History. The Crustacea and Arachnids Eurypteridæ, 1909.

Vol. 4, Chapter xi, pp. 283-294.

Woodward (Henry). On some points in the structure of the Xiphosura, having reference to their relationship with the Eurypteridæ.

Quart. Jour. Geol. Soc. London, vol. 22, 1867, p. 28.

On page 32 the author uses the term Prestwichia for a new genus with *Prestwichia anthrax* Prest. for the type. This generic name was used by Lubbock in 1863, therefore it is a syn. and the genus *Euproops* Meek is available for the genus.

——— On the discovery of Trilobites in the Upper Green (Cambrian) slates of the Penrhyn Quarries, North Wales.

Quart. Jour. Geol. Soc. London, vol. 44, 1888, p. 74, pl. 6.

Concoryphe viola nov.

Its peculiar facial sutures suggest a new generic name.

——— Note on a collection of Carboniferous Trilobites from the Banks of the Hodder near Stonyhurst, Lancashire.

Geol. Mag., Dec. iv, vol. 1, 1894, p. 481, plate 14.

Phillipsia van-der-Grachtii n. sp., *P. Polleni* n. sp.

The author also gives figures of the pygidia of *Phillipsia Derbiensis* Martin and *P. gemmulifera* Phillips.

——— Contributions to our knowledge of the genus Cyclus from the Carboniferous formation of various British localities.

Cyclus Jonesianus H. W., *C. radialis* Phil., *C. Scottii* H. W., *C. Johnsoni* H. W., *C. Rankini* H. W.

Geol. Mag., Dec. iv, vol. 1, 1894, pp. 530-539, plate 15.

The curious little shield-like Crustaceans, classed under Cyclus, were first noticed by de Koninck in 1841—Descript. des Animaux Foss. Carb. de Belg. 1842, p. 591, plate 53—and have been subsequently illustrated and described by various authors.

——— On a collection of Trilobites from Coddon Hill beds, Lower Culm Measures near Barnstaple, Devon, and one from Glamorganshire.

Geol. Mag., Dec. iv, vol. 9, 1902, pp. 481-487, plate 20.

Griffithides Barksi n. sp. *Phillipsia spatulata* n. sp. *Proetus Coddonensis* n. sp.

For previous papers on the Culm Trilobites see: Henry Woodward, on the discovery of Trilobites in the Culm Shales, Geol. Mag., 1884, pp. 534-545, pl. xvi; Woodward Carboniferous Trilobites, Mon. Pal. Soc., 1883-1884, p. 1-86, plates l-x; G. J.

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WOODWARD (Henry)—Continued

Hinde and Howard Fox, The Radiolarian rocks in the Lower Culm-measures, Quart. Jour. Geol. Soc., 1895, vol. 51, pp. 609-668, plates 23-28; note on the Trilobites, by Henry Woodward, pp. 646-649, plate 28, figures 1-8.

——— The Canadian Rockies. Part 1. On a collection of Middle Cambrian fossils obtained by Edward Whymper from Mount Stephen, B. C.

Geol. Mag., Dec. iv, vol. 9, 1902, pp. 529-544, 17 figures.

Ogygopsis Klotzi Rom. *Bathyuriscus Howelli* Walc., *B. (Kootenia) Dawsoni* Walc., *B. pupa* Matth. *Neolenus serratus* Rom., *N. granulatus* Matth. *Ptychoparia Cordillerae* Walc. *Zacanthoides (Olenoides) spinosus* Walc. *Oryctocephalus Walkeri* Matth., *O. Reynoldsi* F. R. Cowper Reed.

Conocephalites (Conaspis ?) cf. *perseus* Hall. *Corynexochus Roemeringeri* Matth. *Dolichometopus occidentalis* Matth. *Agnostus interstrictus* White, *A. montis* Matth. *Anomalocaris Canadensis* Whiteaves.

Dr. Henry Woodward, one of the best authorities on recent and fossil Crustacea, retains Rominger's genus Ogygopsis, and remarks that *Ogygopsis Klotzi* differs from Ogygia proper in having a well-defined ocular ridge and a narrow palpebral lobe. It seems convenient to separate this Rocky Mountain form generically from the other examples of Ogygia.

——— On two Trilobites from the Devonian Slates of Cornwall, obtained by Walter Barratt, Esq.

Geol. Mag., Dec. iv, vol. 10, 1903, pp. 28-31.

The author figures *Homalonotus Barratti* n. sp., and gives a list of English Devonian species of Devon and Cornwall.

Phacops latifrons ? Bronn—a fragment—is referred to this genus.

——— Note on some fragmentary remains of fossils from the upper part of Mount Noyes (Cambrian Rockies).

Geol. Mag., Dec. iv, vol. 10, 1903, pp. 297-299, three figures.

Olenellus Thompsoni Hall. *Olenellus* sp.

——— Notes on a series of Trilobites obtained by Mr. Howard Fox from the Devonian of Cant Hill, St. Minver, Cornwall.

Geol. Mag., Dec. v, vol. 2, 1905, pp. 151-154, plate 5.

Phacops latifrons Bronn., *P. granulatus* Münster, *P. (Cryphaeus) punctatus* Stein.

——— On a collection of Trilobites from the Upper Cambrian of Shantung, North China.

Geol. Mag., Dec. v, vol. 2, 1905, pp. 211-215—continued on p. 251-255, plate 13.

This article contains an abstract of Herr H. Monke's paper, entitled, "Contributions to the Geology of Shantung—1. Upper Cambrian Trilobites from Yen-tsy-yai," Jahrb. d. k., Preeuss Geol: Landesanstalt and Bergakademie, 1902, vol. 23, pp. 103-151, pl. 3-9.

The author illustrates *Drepanura Premesnili* Bergeron (which, like *D. Ketteleri* Monke, is founded upon pygidia and separate and imperfect head shields, also with elongated cheek-spines. The lateral caudal spines are very much more elongated in *D. Ketteleri* and remind one of the very long lateral cheek and caudal spines of *Bathynotus holopyga* Hall).

Stephanocare Richthofeni Monke, referred to the genus Olenoides in the text, p. 254, fig. 2.

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WOODWARD (Henry)—Continued

——— Notes on some Crustaceans and two Myriopods from the Lower Coal measures near Colne, Lancashire.

Geol. Mag., Dec. v, vol. 2, 1905, pp. 437-44.

Decapoda: Macroura *Anthrapalaemon serratus* n. sp., *A. Woodwardi* R. Etheridge, *A. Traquairii ?* Peach.

——— Further note on *Cyclus Johnsoni* from the Coal Measures Dudley.

Geol. Mag., Dec. v, vol. 2, 1905, pp. 490-492.

——— Two new species of Eurypterus from the Coal Measures Ilkeston.

Geol. Mag., Decade v, vol. 4, 1907, pp. 277-282, plate 13.

Eurypterus Moyseyi n. sp., *E. Derbiensis* n. sp.

The author gives a sketch of the Carboniferous Euryptidae.

——— On the genus Pygocephalus (Huxley), a primitive Schizopod Crustacean from the Coal Measures.

Geol. Mag., Decade v, vol. 4, 1907, pp. 400-407, plate xviii.

Pygocephalus Cooperi Huxley, *P. (Anthrapalaenon) Parkeri* n. sp., fig. 2, in text.

——— Further notes on the Arthropoda of the British Coal Measures.

Geol. Mag., Decade v, vol. iv, 1907, pp. 539-549.

Bellinurus Baldwini n. sp., *B. longicaudatus* n. sp.

——— Note on the genus Hastimima from Brazil and Cape.

Geol. Mag., Decade v, vol. 6, 1909, pp. 486-88.

——— On a pygidium of Bronteus from the Devonian of Gerolstein Eifel, preserved in the collection of the late Mr. Townshend M. Hall, in the Athenaeum, Barnstaple.

Geol. Mag., Decade v, vol. 7, 1910, pp. 407-410, figures.

The author figures *Bronteus Halli* sp. nov., *B. thysanopeltis* Barr., *B. speciosus* Corda.

——— Note on a new species of Caryocaris (*C. Kilbridensis*) from the Arenig rocks of the Kilbride Peninsula.

Quart. Jour. Geol. Soc. London, vol. 68, p. 99, 1912.

The species approaches the *Caryocaris wrightii* Salter.

The author notes near the centre of the carapace two round bodies which appear to be eggs, and may possibly be homologous with the pair of ephippial eggs so often observed in Daphnia.

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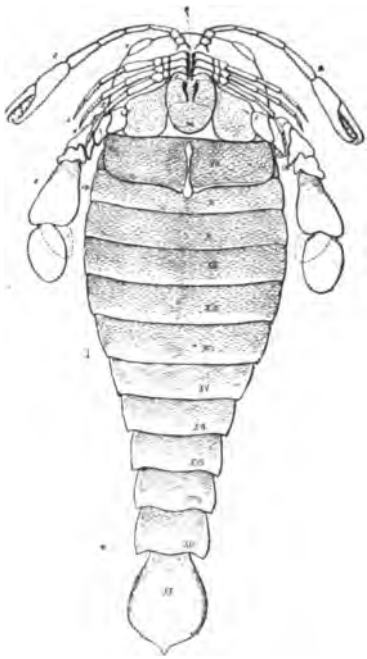
WOODWARD (Henry)—Continued

——— The position of the Merostomata.

Geol. Mag., Decade v, No. 7, July, 1913, p. 293, two text figures.

The author gives a sketch of the genus from McCoy's weird restoration of *Pterygotus problematicus,* in fifth edition of Lyell's Manual of Elementary Geology, 1855, p. 420.



Pterygotus Anglicus.

Dithyrocaris Scouleri

Also the further discoveries of Pterygotus, made by Robert Slimon in the Geol. Sur. Memoir in 1859, illustrated by 16 plates and text figures.

Salter contributed a restoration of *Pterygotus anglicus* to Murchison's Siluria, 1859, edition. He gives only two pairs of appendages to the head. The operculum is placed in front of the mouth, and the lower lip or metastoma is absent.

Dr. Nieszkowski, in his paper on *Eurypterus remipes,* gives restorations of the upper and under sides of Eurypterus, showing the appendages of the mouth in situ and the thoracic plates on the under side of the body.

Other restoration of several forms of Pterygotus Stylonurus Eurypterus, without descriptions, are given in David Page's Advanced Text Book of Geology, 1859, all more or less correct.

Excellent descriptions and figures of American species of Eurypterus and Pterygotus are given by James Hall in Palæont. New York, vol. 3, pt. 1, pp. 382-419, 80 plates and 10 additional plates, the accuracy of which still remains unchallenged.

Mr. J. W. Salter, in the Quart. Jour. Geol. Soc., 1862 and 1863, contributed descriptions of Eurypterus and allied form of Pterygotus.

Dr. Henry Woodward figured and described a very complete example of *Slimonia acuminata* in the Intellectual Observer, 1863, vol. 4, p. 229; also of *Eurypterus lanceolatus* in the Geol. Mag., 1864, vol. 1, p. 107, pl. 5, figs. 7-9. In 1865 he figured and described *Stylonurus scoticus, S. Poweriei, S. Symondsi Hemiaspis limuloides* in the

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WOODWARD (Henry)—Continued

Quart. Jour. Geol. Soc., vol. 21, pp. 482-92, plates 13-14. The same author, in 1866, commenced a Monograph of the British Crustacea of the Order Merostomata, published in the Palæont. Soc., 1866-1878, in which 14 genera and 83 species are recorded, described and illustrated.

The author does not include in this historical sketch the paper by DeKay, 1825, who gave the generic name of Eurypterus, or reference to Mitchell's paper in the Am. Monthly Mag., vol. 3, 1888, p. 291, in which he describes the now well-known *Eurypterus remipes* DeKay, as a fossil fish.

Woodward quotes the well-known paper by Dr. Holm, St. Petersburg Academy, 1896, and his investigations of *Eurypterus fischeri* from the Island of Oesel. In this locality the fossils are not metamorphosed into carbonaceous film, as in other deposits, and he was able to elaborate its organization in such detail that *E. fischeri* has really become the most completely known of all extinct animals.

Woodward's paper includes two full-page figures of *Eurypterus fischeri,* from Holm's paper.

The paper closes with a notice of Dr. Clarke and Ruedemann's memoir on the Eurypterida of New York, noted in this Bibliography.

——— *Rochdalia Parkeri* by Henry Woodward.

Geol. Mag., Decade v, No. 8, vol. 10, p. 352, 1913.

This new genus and species from the Coal Measures of Rochdale, the author places with the Branchiopoda in the order Anostraca.

Zelizoko (J. V.) Geologisch—palæontologische Verhältnisse der nächsten Umgebung von Rozmital in Bohemen.

Bull. Acad. Sci. de Bohéme, 1906, 2 plates.

Trinucleus Alfredi nov. *Dionide formosa* Barr. *Phacops (Chasmops) Bohemicus* nov. Calymmene sp. Dalmania sp.

Zimmermann (Hugo). Trilobiten aus dem devonkalk des Rittberg bie Czellechowitz.

Verhandl. des Naturf. Vereins in Brünn, Bd. xxx, 1891, plate.

Dechenella rittbergensi n. sp., p. 119, pl. 1, fig. 4. Referred by Richter to the subgenus Eudechenella.

The author figures and describes *Bronteus alutaceus* Goldf. *Dechenella Verneuli* Barr. Referred by Richter to *D. Rittbergensis.*

Cyphaspis granulosus Steininger and Proetus sp. Referred by Richter to *Schizoproetus celechovicensis* Smycka.

Zuber (Rudolf). Najdawniejszy swiat organiczny i najstarsze formacye osadowe Napisal.

Kosmos polski, vol. 23, 1899, pp. 12-24.

The author illustrates *Olenellus Thompsoni* and *Mesonacis vermontana.*

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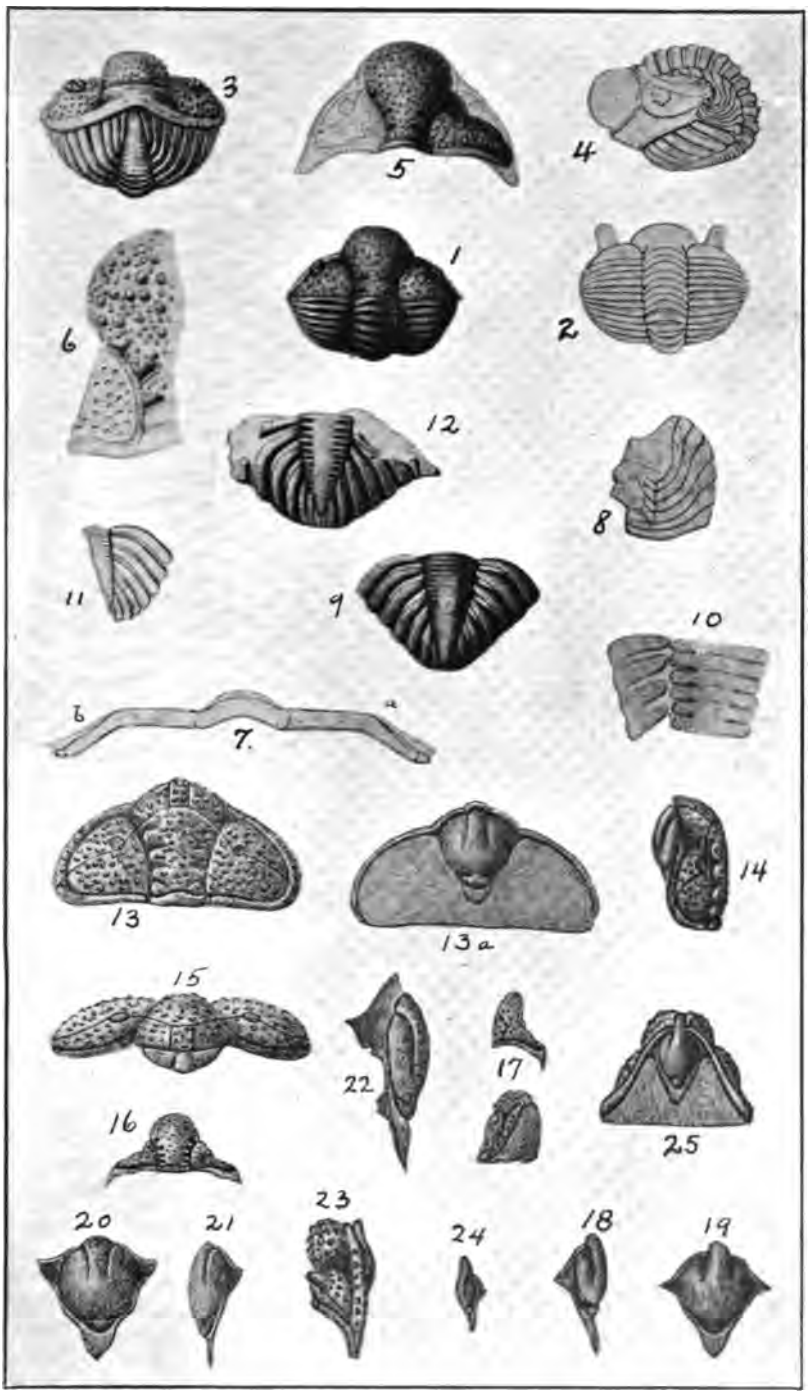
Plate 1



Figs. 1-12. Encrinurus sex-costatus.
Figs. 13-15. Encrinurus (Cromus), Beaumonti.
Figs. 16-19. E. (Cromus) transiens.
Figs. 20-22. E. (Cromus) Bohemicus.
Figs. 23-24. Encrinurus punctatus.

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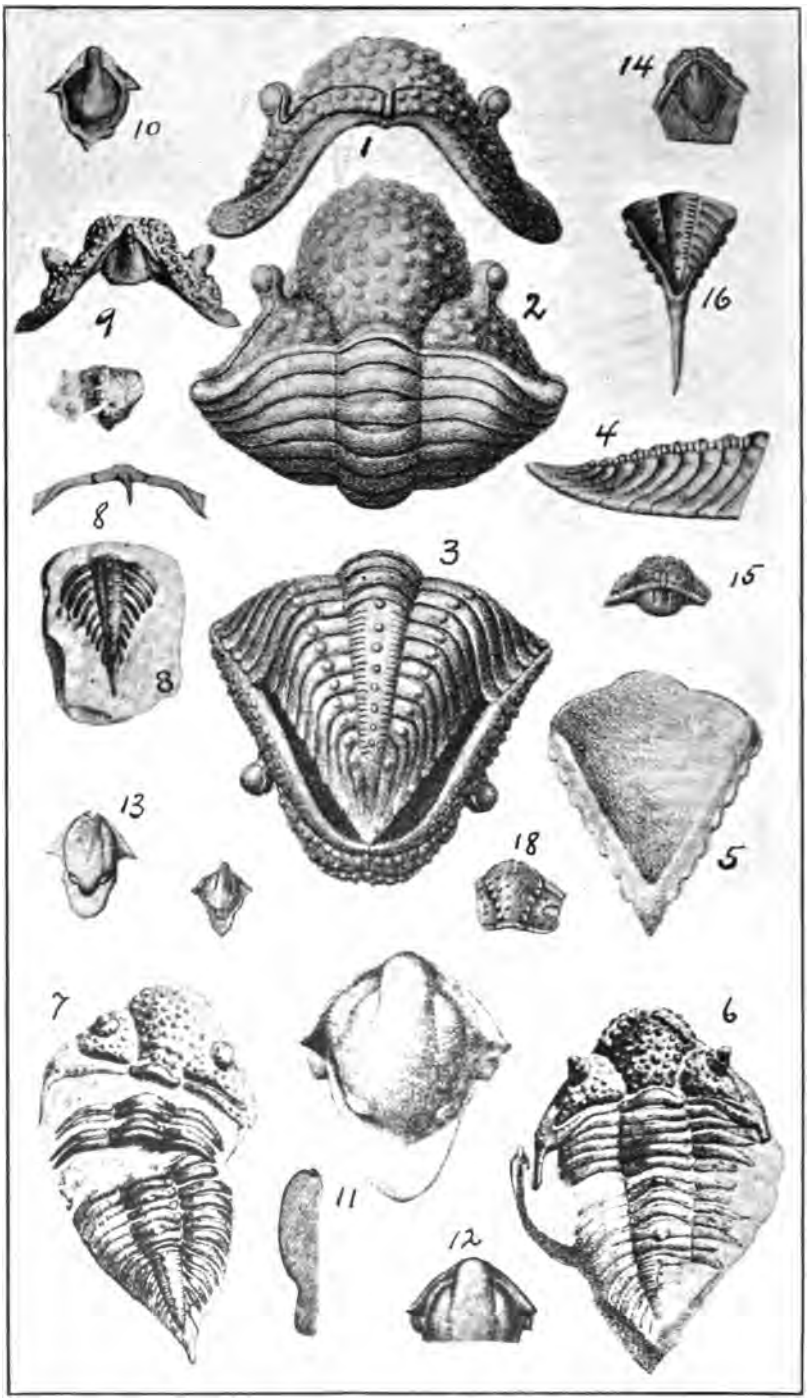
Plate 2



Encrinurus punctatus.

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Plate 3

Figs. 1-10. Cryptonymus variolaris.
Fig. 11. Linne's fig. of pygidium.
Fig. 12. Pygidium Encrinurus multi-segmentatus.
Fig. 13. E. Eagani.
Fig. 14. E. obtusus.
Fig. 15. E. ornatus.
Fig. 16. E. laevis.
Fig. 17. Cybele vigilans.

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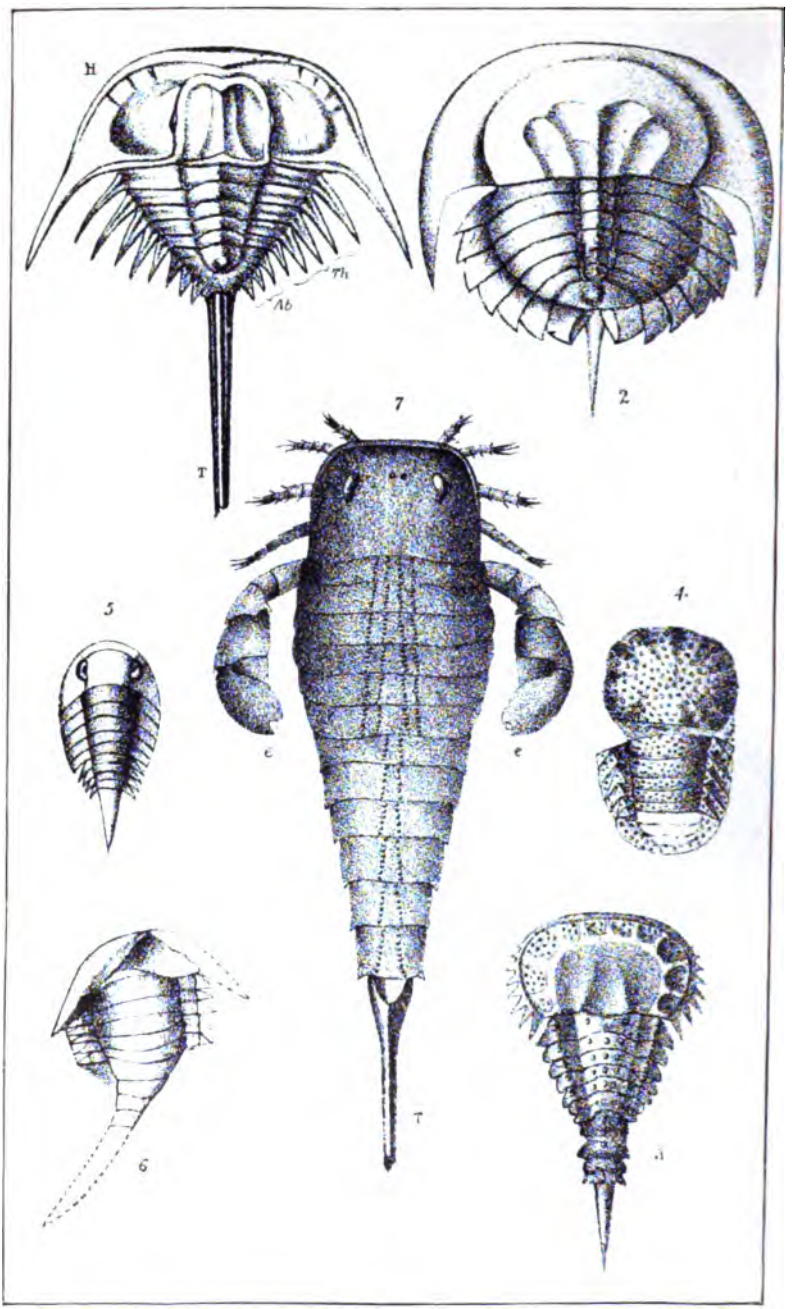
Plate 4



(The figures copied after Dr. Henry Woodward's plate, Proc. Geol. Soc., vol. 23, 1867.)

Fig. 1. Belinurus reginae Baily Coal Measures, Ireland.
Fig. 2. Euproops rotundata Prestwich Coal Measures, Eng.
Fig. 3. Hemiaspis linuloides. H. Woodward, Ludlow, Eng.
Fig. 4. Bunodes limula Eichwald Silurian, Baltic.
Fig. 5. Pseudoniscus aculeatus Nieszkowski Sil., Baltic.
Fig. 6. Exapinurus Schrenkii Nieszkowski Silurian, Baltic.
Fig. 7. Eurypterus remipes De Kay Silurian, New York.

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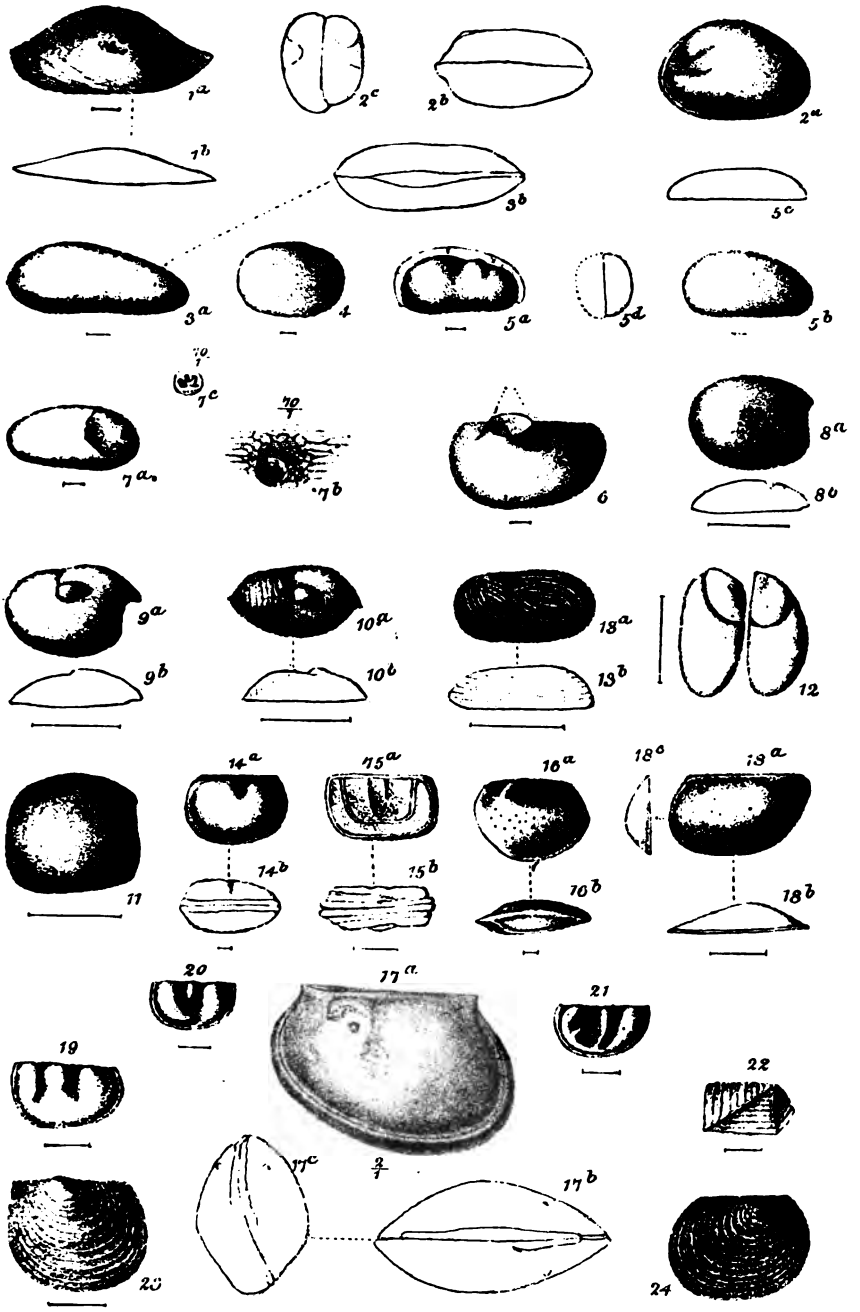
Plate 5



(The figures are copied after T. Rupert Jones's plate, Monthly Microscopical Jour., 1870.)

Fig. 1. Bairdia curta McCoy.
Fig. 2. Thlipsura corpulenta Jones & Holl.
Fig. 3. Cythere Jukesiana J. & H.
Fig. 4. Cytherella brevis Jones.
Fig. 5. Cytherellina siliqua Jones
Fig. 6. Æchmina cuspidata J. & H.
Fig. 7. Carbonia Agnes Jones.
Fig. 8. Cypridina Phillipsiana Jones.
Fig. 9. Cypridella Koninckiana Jones.
Fig. 10. Cyprella subannulata Jones.
Fig. 11. Entonoconchus Scouleri McCoy.
Fig. 12. Entomis divisa Jones.
Fig. 13. Entomis biconcentrica Jones.
Fig. 14. Primitia renulina J. & H.
Fig. 15. Kirkbya Urei Jones.
Fig. 16. Moorea silurica J. & H.
Fig. 17. Leperditia Balthica Hisinger.
Fig. 18. Isochilina gracilis Jones.
Fig. 19. Beyrichia Wilckenziana Jones.
Fig. 20. Beyrichia Kloedeni McCoy.
Fig. 21. Beyrichia complicata Salter.
Fig. 22. Leaia Leidyi Lea.
Fig. 23. Estheria membranacea Pat.
Fig. 24. Estheria tenella Jordan.

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AN ANNOTATED LIST OF THE BIRDS OF SAN DIEGO COUNTY, CALIFORNIA

By FRANK STEPHENS

Transactions, San Diego Society of Natural History.
Vol. 3, No. 2. Pp. 142-180
February 15, 1919

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AN ANNOTATED LIST

OF THE

Birds of San Diego County, California

By FRANK STEPHENS

Water Birds

Order PYGOPODES. Diving Birds.

Excellent divers, obtaining their food principally under water; the food consisting of small fishes, water beetles, larvæ and other aquatic life. They prefer escaping from their enemies by diving rather than by flight. Innocuous, with the possible exception of consuming small quantities of young fish.

Family COLUMBIDÆ. Grebes.

1. WESTERN GREBE. **Æchmorphus occidentalis.**

Rather common winter residents (Sept. to April) on the ocean and bays along the coast. A few are found in winter on the larger fresh water ponds and reservoirs.

2. HORNED GREBE. **Colymbus auritus.**

Occasional winter visitants off shore, rare on bays and inland waters. Immature birds are difficult to distinguish from immature birds of the next species.

3. EARED GREBE. **Colymbus nigricollis californicus.**

Common winter residents on salt and fresh waters of the county. A few remain through the summer on tule-bordered fresh water ponds and breed. Not as abundant as they were before plume hunters began killing them for the skins of their breasts.

4. PIED-BILLED GREBE. DABCHICK. **Podilymbus podiceps.**

Present in small numbers all the year. Breed about tule-bordered marshes and ponds. Also found on salt water in winter. The winter residents go north in spring and are replaced by newcomers from the south.

Family GAVIIDÆ. Loons.

5. COMMON LOON. **Gavia immer.**

Common winter residents (October to April) along the coast and on the bays, occasional on reservoirs and lakes containing fish.

6. PACIFIC LOON. **Gavia pacificus.**

Rather common at the same time and places as the preceding, except that they are not known to go any distance inland.

7. RED-THROATED LOON. **Gavia stellata.**

Rather rare winter visitant. Found only on salt water.

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Family ALCIDÆ. Auks, Murres. Puffins.

8. RHINOCEROS AUKLET. **Cerorhinca monocerata.**
Rather common winter residents off shore. Occasionally dead birds are found washed ashore on beaches.

9. CASSIN AUKLET. **Pytocramphus aleuticus.**
More or less abundant at sea all the year. Breed on the Coronado Islands. Dead birds wash ashore occasionally.

10. ANCIENT MURRELET. **Sinthliboramphus antiquus.**
Found occasionally off shore in winter. A dead bird was found on the beach at Pacific Beach.

11. XANTUS MURRELET. **Brachyramphus hypoleucus.**
Rather common at sea all the year. Breed on the Coronado Islands.

Order LONGIPENNES. Long-winged Swimmers.

Birds of this order feed on fish swimming near the surface of the water and on offal floating on the surface, occasionally on material picked up on land. Fish are obtained by plunging down on them from the air. The fish are mostly small species but little used for human food.

Family STERCORARIDÆ. Jægers.

12. POMARINE JÆGER. **Stercorarius pomarinus.**
Occasional off shore, principally in the migrations.

13. PARASITIC JÆGER. **Stercorarius parasiticus.**
Occasional along the coast in fall and winter.

14. LONG-TAILED JÆGER. **Stercorarius longicaudus.**
One taken at Pacific Beach Sept. 19, 1904.

Family LARIDÆ. Gulls and Terns.

15. PACIFIC KITTIWAKE. **Rissa tridactyla pollicaris.**
Occasional off shore in winter.

16. GLAUCOUS-WINGED GULL. **Larus glaucescens.**
Occasional along the coast in winter.

17. WESTERN GULL. **Larus occidentalis.**
Abundant residents of bays and coasts. Rare inland. Breed on the Coronado Islands.

18. HERRING GULL. **Larus argenteus.**
Rather common winter residents of the coast and bays. Occasional about fresh waters.

19. CALIFORNIA GULL. **Larus californicus.**
Common winter residents (Sept. to May) of coast and bays, and rather common on fresh waters. Sometimes follows the plow to pick up larvæ and worms.

20. RING-BILLED GULL. **Larus delawarensis.**
Common winter residents of coast and bays (Sept. to May). Occasional inland.

21. SHORT-BILLED GULL. **Larus brachyrhynchus.**
Rare winter visitant along the coast.

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22. HEERMANN GULL. **Larus heermanni.**
Rather common on bays and along the coast in summer, fall and winter. Contrary to the custom of most birds Heermann Gulls go south in spring to breed, on the islands off the Mexican coast.
23. BONAPARTE GULL. **Larus philadelphia.**
Rather common migrant, both along the coast and in the interior. A few remain along the coast in winter.
24. CASPIAN TERN. **Sterna caspia.**
Rare migrant. Has been taken at San Diego.
25. ROYAL TERN. **Sterna maxima.**
Rather rare winter residents along the coast. Go in small flocks.
26. ELEGANT TERN. **Sterna elegans.**
Rare or irregular winter visitant along the coast.
27. FORSTER TERN. **Sterna forsteri.**
Found sparingly along the coast nearly all the year. Common in the migrations when they also appear inland.
28. COMMON TERN. **Sterna hirundo.**
Occasional along the coast in the migrations.
29. LEAST TERN. **Sterna antillarum.**
Common summer residents, breeding at several places on the beach. Apparently not found inland.
30. BLACK TERN. **Hydrochelidon niger surinamensis.**
Rather common about fresh waters containing small fish in summer. Migrates along the coast.

Order TUBINARES. Tube-nosed Swimmers.
Marine, many species being found far at sea. Food and habits similar to those of gulls.

Family DIOMEDIIDÆ. Albatrosses.
31. BLACK-FOOTED ALBATROSS. **Diomedea nigripes.**
32. SHORT-TAILED ALBATROSS. **Diomedea albatrus.**
Frequently seen off the coast at all times of the year. Dead birds occasionally wash ashore.

Family PROCELLARIDÆ. Fulmars and Shearwaters.
33. PACIFIC FULMAR. **Fulmaris glacialis glupischa.**
Common at sea in winter. Dead birds frequently wash ashore. Dichromatic; the black phase is most often found here.
34. RODGERS FULMAR. **Fulmaris rodgers.**
Found with the Pacific Fulmar, but in smaller numbers.
35. PINK-FOOTED SHEARWATER. **Puffinus creatopus.**
Rather common at sea in summer and fall.
36. BLACK-VENTED SHEARWATER. **Puffinus opisthomelas.**
More or less abundant at sea in summer after the close of the breeding season; occasionally seen near the b ach. They leave for their breeding grounds on islands off the Mexican coast in March.

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37. SOOTY SHEARWATER. **Puffinus griseus.**
Common at sea all the year. Most common in summer.
38. SLENDER-BILLED SHEARWATER. **Puffinus tenuirostris.**
Occasional at sea in winter.
38a. FORK-TAILED PETREL. **Oceanodroma furcata.**
I found a dead Fork-tailed Petrel washed up on the beach at Ocean Beach December 23, 1918. This is the southermost record for this Petrel. Their range is the north Pacific Ocean.
39. SOCORRO PETREL. **Oceanodroma socorroensis.**
Common at sea throughout the year. Breeds on the Coronado Islands.
40. BLACK PETREL. **Oceanodroma melania.**
Common at sea all the year. Breeds on the Coronado Islands.

Order STEGANOPODES. Totipalmate Birds.

Fish eating birds, mostly marine in distribution, but a few species frequent fresh waters. The fish eaten are usually small, but some are young fish that would be of economic importance full grown. The Cormorants usually pursue their prey under water, but the Pelecans scoop theirs up from the surface or plunge down on them from the air. Most species of this order are social in habit, particularly in the breeding season.

Family PHALACROCORACIDÆ. Cormorants.

41. FARALLONE CORMORANT. **Phalacrocorax auritus albociliatus.**
Common resident along the coast. Occasional inland on fresh waters. Breed on rocky cliffs over the water.
42. BRANDT CORMORANT. **Phalacrocorax penicillatus.**
Common resident along the coast. Not found on fresh waters. Breeds on the Coronado Islands.
43. BAIRD CORMORANT. **Phalacrocorax pelagicus resplendens.**
Resident along the coast and on the islands, but not as abundant as either of the other species. Found only about salt water.

Family PELECANIDÆ. Pelecans.

44. WHITE PELECAN. **Pelecanus erythrorhynchus.**
Occasionally seen in this county, in flight or about fresh waters, in fall or winter.
45. CALIFORNIA BROWN PELECAN. **Pelecanus californicus.**
Abundant at sea, along shore and on bays. Not found on fresh waters. Breeds on the Coronado Islands.

Family FREGATIDÆ. Man-o'-war Birds.

46. MAN-O'-WAR BIRD. **Fregata aquila.**
Stragglers from Mexican waters occasionally appear along the coast.

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Order ANSERES. Lamellirostral Swimmers.

Swimming birds of wide distribution, mostly on fresh waters. The feeding habits vary greatly; some species being vegetarian, while others eat animal food or combine it with vegetation in some form. Most of the species are edible, and being of medium or large size furnish an important amount of human food. The order is a large one containing numerous genera, mostly belonging to one family.

Family ANATIDÆ. Ducks, Geese and Swans.

47. AMERICAN MERGANSER. **Mergus americanus.**
48. RED-BREASTED MERGANSER. **Mergus serrator.**
49. HOODED MERGANSER. **Lophodytes cucullatus.**

The Mergansers are rare winter visitors, and are mostly found on salt waters. They are fish eaters and are not edible.

50. MALLARD. **Anas platyrhynchos.**

Common winter residents, principally on fresh waters. Occasional summer residents, breeding about lakes and in marshes.

51. **Chaulelasmas streperus.**

Rather common winter residents on fresh waters. More plentiful in the migrations.

52. BALDPLATE. WIDGEON. **Mareca americana.**

Common winter residents, principally on fresh waters.

53. GREEN-WINGED TEAL. **Nettion carolinense.**

Common winter residents, principally on fresh waters.

54. BLUE-WINGED TEAL. **Querquedula discors.**

Rare winter visitants.

55. CINNAMON TEAL. **Querquedula cyanoptera.**

Common spring migrants. A few remain through the summer and breed about lakes and in marshes. Found only on fresh waters.

56. SHOVELER. SPOONBILL DUCK. **Spatula clypeata.**

Abundant winter resident, principally on fresh waters.

57. PINTAIL. SPRIGTAIL. **Dafila acuta.**

Abundant winter residents, principally on fresh waters.

58. WOOD DUCK. **Aix sponsa.**

Rare winter visitant. Two specimens taken in this county are in museums.

59. **Marila americana.**

Common winter residents, principally on fresh waters.

60. CANVASBACK. **Marila valisneria.**

Rather common winter residents along the seacoast. Rare in the interior. Redhead Ducks are often mistaken for Canvasbacks

61. SCAUP DUCK. BLUE-BILL. **Marila marila.**

Rare winter visitants along the seacoast.

62. LESSER SCAUP DUCK. BLUE-BILL. **Marila affinis.**

Common winter residents on salt and fresh waters.

63. RING-NECKED DUCK. **Marila collaris.**

Occasional winter visitant.

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64. BUFFLEHEAD. BUTTER-BALL. **Charitonetta albeola.**
Common winter residents (Nov. to March), principally on salt waters.
65. OLD SQUAW. **Harelda hyemalis.**
Occasional winter visitant.
66. WHITE-WINGED SCOTER. **Oidemia deglandi.**
Common winter residents on bays and at sea. A few non-breeding birds remain through the summer.
67. SURF SCOTER. **Oidemia perspicillata.**
Abundant winter residents on bays and at sea. Both species of Scoters are fish and shell eating ducks and are not edible.
68. RUDDY DUCK. **Erismatura jamaicensis.**
Abundant winter residents and common in summer. Frequent both fresh and salt waters.
69. LESSER SNOW GOOSE. **Chen hyperboreas.**
Formerly abundant winter residents, now much less plentiful. Usually seen in flocks of considerable size. The food is mostly green vegetation, such as growing grain and grass.
70. WHITE-FRONTED GOOSE. **Anser albifrons gambeli.**
Formerly common winter residents. Usually found in small flocks and sometimes singly.
71. HUTCHINS GOOSE. **Branta canadensis hutchinsi.**
Formerly common winter residents, now much diminished in numbers.
72. CACKLING GOOSE. **Branta canadensis minima.**
This small "Honker" probably comes this far south in winter, but I know of no example from this county in any collection.
73. BLACK BRANT. **Branta nigricans.**
Formerly rather common winter residents, now rare. Seldom found on fresh waters.
74. FULVOUS TREE DUCK. **Dendrocygna bicolor.**
Rather common spring migrant. Rare winter visitant. Stragglers may remain through the summer and breed. Found on fresh waters.
75. WHISTLING SWAN. **Olor columbianus.**
Rare winter visitants.

Order HERODINES. Herons, Ibises, etc.

Wading birds frequenting marshes or the borders of ponds, lakes and bays for food, catching frogs, minnows, insects or other aquatic forms of life of no economic importance except in a very general way. Most species are not edible.

Family IBIDIDÆ. Ibises.

76. WHITE-FACED GLOSSY IBIS. **Plegadis guarauna.**
Rather common spring migrants. Breed in small numbers about suitable marshes in the warmer valleys. Edible, the only species of the order found here that is edible. This is the "Black Curlew" of sportsmen. While externally they resemble curlews technically they are not at all closely related.

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Family CICONIIDÆ. Storks.

77. WOOD IBIS. **Mycteria americana.**

Irregular or casual summer visitors, mostly young birds that have straggled from their breeding grounds on the shores of the Gulf of California.

Family ARDEIDÆ. Herons.

78. AMERICAN BITTERN. **Botaurus lentiginosus.**

Rather common winter residents of marshes. Probably a few remain in summer and breed.

79. LEAST BITTERN. **Ixobrychus exilis.**

Very secretive and seldom seen. Probably rather common summer residents in tule marshes.

80. GREAT BLUE HERON. **Ardea herodias.**

Present through the year in small numbers.

81. AMERICAN EGRET. **Herodias egretta.**

Formerly a rather common resident, but now almost exterminated by plume hunters. Seen occasionally in the migrations.

82. SNOWY EGRET. SNOWY HERON. **Herodias candidissima.**

Formerly rather common winter residents. So nearly exterminated by plume hunters that none have been seen in this county for several years.

83. LOUISANA HERON. **Hydranga tricolor ruficollis.**

One taken at the south end of San Diego Bay in January, 1914.

84. ANTHONY GREEN HERON. **Butorides virescens anthonyi.**

Common migrants. Rare summer residents.

85. BLACK-CROWNED NIGHT HERON. **Nycticorax nycticorax nævius.**

Common migrants. Rare summer residents. More common in winter.

Order PALUDICOLÆ. Cranes and Rails.

Family GRUIDÆ. Cranes.

Large, heron-like birds frequenting plains and open ground. The food is frogs, grasshoppers, beetles, seeds, etc. Edible.

86. LITTLE BROWN CRANE. **Grus canadensis.**

87. SANDHILL CRANE. **Grus mexicana.**

The Cranes migrate in considerable flocks in fall and spring, often without stopping in the county. Occasional in winter on grass or grain fields.

Family RALLIDÆ. Rails, Gallinules, Coots.

Medium or small sized birds inhabiting marshes or ponds with grassy shores. Most species are shy and hide in grass, tules or weeds. The food is frogs, minnows, water beetles, larvæ, etc. The larger rails are edible.

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88. LIGHT-FOOTED RAIL. CALIFORNIA CLAPPER RAIL. **Rallus levipes.**

Formerly common residents of the salt marshes along the coast. Now nearly exterminated by persistent hunting.

89. VIRGINIA RAIL. **Rallus virginianus.**

Rather common migrants. Rare summer residents of fresh water marshes.

90. CAROLINA RAIL. SORA. **Porzana carolina.**

Rather common migrants. Occasional throughout the year.

91. CALIFORNIA BLACK RAIL. **Creciscus coturniculus.**

Rare residents of salt marshes along the coast.

92. FLORIDA GALLINULE. **Gallinula galeata.**

Rather rare residents of tule bordered ponds.

93. COOT. MUD HEN. **Fulica americanus.**

Abundant residents of fresh water lakes and ponds.

Order LIMICOLÆ. Shore Birds.

Family PHALAROPIDÆ. Phalaropes.

A small family of rather small birds with feet partly webbed, thus connecting the swimmers with the shore birds. Their habits are also intermediate as they feed partly on insects picked up on shores of streams and ponds and also take part of their food while swimming on the surface of the water. Most species breed in the arctic regions.

94. RED PHALAROPE. **Phalaropus fulicarius.**

Abundant migrants at sea. Common migrants inland. Considerable numbers remain off shore all winter.

95. NORTHERN PHALAROPE. **Lobipes lobatus.**

Rather common migrants along the coast and inland.

96. WILSON PHALAROPE. **Steganopus tricolor.**

Rare migrants in this county.

Family RECURVIROSTRIDÆ. Avocets and Stilts.

A small family of medium sized, very long-legged birds, that frequent the shores of ponds and lakes, feeding on the insect life found in the water or on the shores. Although the webs at the base of the toes are quite small these birds are good swimmers, though they prefer wading. Edible.

97. AVOCET. **Recurvirostra americana.**

Rather common migrants.

98. BLACK-NECKED STILT. **Himantopus mexicanus.**

Rather common migrants. Probably rare summer residents, as I have found the species breeding in Orange county.

Family SCOLOPACIDÆ. Snipe, Sandpipers, Curlews, etc.

This is a large family of rather small birds that frequent the shores of streams, ponds, lakes and ocean beaches, feeding on the great variety of small animal life found at the waters edge, or in wet places. Many species wade more or less; none are habitual

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swimmers. Most species large enough to be worth while are edible. None of the species are directly harmful to man's interests.

99. WILSON SNIPE. JACK SNIPE. **Gallinago delicata.**

Common spring and fall migrants. Occasional winter residents of wet grassy localities. Occur in small companies.

100. LONG-BILLED DOWITCHER. **Macrorhamphus scolopaceus griseus.**

Common spring and fall migrants along the coast. Winter residents in small numbers. Uusually found in flocks with other shore birds.

101. KNOT. **Tringa canutus.**

Rather common migrants along the coast and occasional winter residents.

102. BAIRD SANDPIPER. **Pisobia bairdii.**

Migrates principally through the Colorado valley and eastward. One bird has been taken at Pacific Beach.

103. LEAST SANDPIPER. **Pisobia minutilla.**

Abundant migrants and common winter residents along the coast, also common migrants in the interior.

104. RED-BACKED SANDPIPER. **Pelidna alpina sakhalina.**

Abundant migrants along the coast. A few remain through the winter.

105. WESTERN SANDPIPER. **Ereunetes mauri.**

Abundant migrants and common winter residents along the coast.

106. SANDERLING. **Calidris leucophæa.**

Rather common winter residents of the coast and bays.

107. MARBLED GODWIT. **Limosa fedoa.**

Common spring and fall migrants along the coast.

108. GREATER YELLOW-LEGS. **Totanus melanoleucus.**

Rather common migrants in the interior. Comparatively rare in the coast region.

109. WESTERN SOLITARY SANDPIPER. **Heleodromas solitarius cinnamomeus.**

Rather common migrants. Found on fresh and salt waters. Often found singly.

110. WESTERN WILLET. **Catoptrophorus semipalmatus inornatus.**

Rather common winter residents along the coast. Abundant migrants. Occasional about fresh waters.

111. WANDERING TATTLER. **Heteractitis incanus.**

Occasionally seen in the migrations or in the winter on rocky shores.

112. SPOTTED SANDPIPER. **Actitis macularius.**

Rather common winter residents around fresh and salt waters. Prefers rocky shores. Found singly or in small companies.

113. LONG-BILLED CURLEW. **Numenius americanus.**

Formerly abundant in the migrations, now moderately common. Most often seen on the sea beaches and bay shores, but also found on fresh waters.

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114. HUDSONIAN CURLEW. **Numenius hudsonius.**
Common migrants along the coast, occasionally seen around fresh waters.

Family CHARADRIIDÆ. Plovers.

Medium and small sized birds similar in form and habits to those of the preceding family, except that the birds have shorter and heavier bills and are not as closely restricted to the neighborhood of water. Edible.

115. BLACK-BELLIED PLOVER. **Squatarola squatarola.**
Rather common in fall and spring and small numbers remain through the winter along the seacoast.

116. AMERICAN GOLDEN PLOVER. **Charadrius dominicus.**
Rare coastwise migrants.

117. KILLDEER. **Oxyechus vociferus.**
Common residents. Found in pairs or families. A portion of their food is insects picked up on dry ground.

118. SEMIPALMATED PLOVER. **Ægialitis semipalmata.**
Rather common coastwise migrants. Occasional at other seasons. In summer sometimes seen on fresh waters.

119. SNOWY PLOVER. **Ægialitis nivosa.**
Abundant residents on sandy beaches near the surf. Occasionally found about fresh water lakes in summer.

120. WILSON PLOVER. **Ochthodromus wilsonius.**
Rare stragglers. One taken at Pacific Beach June 27, 1894.

121. MOUNTAIN PLOVER. **Podasocys montanus.**
Rather common winter residents in open plains. Apparently does not go near water.

Family APHRIZIDÆ. Surf Birds and Turnstones.

A small family of rather small sized birds inhabiting rocky shores and islands in the sea. They are usually seen singly or in small flocks. The food is marine life found at the waters' edge, usually on or under rocks.

122. SURF BIRD. **Aphriza virgata.**
Rare migrants or winter residents. I took one at Point Loma.

123. RUDDY TURNSTONE. **Arenaria interpres morinella**
Rather common coastwise migrants.

124. TURNSTONE. **Arenaria melanocephala.**
Rather common winter residents of rocky seashores.

Family HÆMATOPIDÆ. Oyster-catchers.

A very small family of medium sized birds inhabiting rocky seashores and islands in the sea. They feed on molluscs, such as bivalves, which their knife-like bills are peculiarly adapted for opening.

125. FRAZAR OYSTER-CATCHER. **Hæmatopus frazari.**
Rare summer visitants to rocky shores along the seacoast.

126. BLACK OYSTER-CATCHER. **Hæmatopus bachmani.**
Uncommon residents of rocky seashores and islands.

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Land Birds

Order GALLINÆ. Gallinaceous Birds.

An important order including such domestic poultry as chickens and turkeys. The family to which these belong (PHASANIDÆ) is not represented by native species in California.

Family TETRAONIDÆ, Grouse, Quail, etc.

A large family of considerable economic importance, as all the species are edible, and many are large enough to furnish a considerable amount of food. The family has a wide distribution, from seacoast to mountain top. Some species are found in forests; others in open country, providing brush or weeds or other cover is available in emergencies. The food is varied, including insects, seeds, leaves, etc. and is mostly gleaned from the ground. A few species feed on fruits, buds and leaves of trees, etc.

127. PLUMED QUAIL. MOUNTAIN QUAIL. **Oreortyx pictus plumiferus.**

Common residents of brushy forests in the mountains. Not migratory.

128. VALLEY QUAIL. **Lophortyx californicus vallicola.**

Abundant residents of foothills and valleys. The ranges of the Plumed and Valley Quails overlap somewhat. Not migratory. No Grouse or Pheasants are native to this county.

Order COLUMBÆ. Pigeons.

Family COLUMBIDÆ

A rather large family of medium sized birds. They are birds of strong flight, and the species found in cool climates are migratory. The food is mainly vegetable, seeds, nuts, fruits, buds and leaves. Edible.

129. BAND-TAILED PIGEON. **Columba fasciata.**

Irregular visitants, occasionally abundant. Found principally in the mountains as acorns are more abundant there. Some "off years" for acorns few or no Pigeons appear in this county. Formerly a few bred here.

130. WESTERN MOURNING DOVE. **Zenaidura macroura marginella.**

Abundant residents of the foothills and valleys. Less common in winter and probably all the individuals migrate, being insensibly replaced by new comers. Beneficial through eating so many seeds, and rarely, if ever, doing any harm.

131. WHITE-WINGED DOVE. **Melopelia asiatica trudeaui.**

Rare stragglers from Lower California. One has been taken at Escondido.

132. MEXICAN GROUND DOVE. **Chamæpelia passerina pallescens.**

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Two or three stragglers from Lower California have been taken in this county.

Order RAPTORES. Birds of Prey.

Family CATHARTIDÆ. Vultures.

A family of very large birds, of general distribution, but in most cases found sparingly. The food of most species is exclusively carrion and the birds are very useful as scavengers and should be rigidly protected.

133. CALIFORNIA VULTURE. CALIFORNIA CONDOR. **Gymnogyps californianus.**

Fairly common when the country was first settled by Americans. When the sheep industry was at its height the shepherds poisoned many carcasses of dead sheep to lessen the numbers of troublesome coyotes. Vultures also ate the carcasses and were poisoned, with the result that Vultures became very scarce. Irresponsible hunters also shot every large bird that came near and this magnificent and useful Vulture was nearly exterminated. A state law now imposes a heavy penalty for killing a Vulture and under this protection the species is slowly increasing in numbers. This species should not be called a Condor, as the true Condor is a South American bird of another genus.

134. TURKEY VULTURE. TURKEY BUZZARD. **Cathartes aura septentrionalis.**

Common spring, summer and fall residents, less common in winter. Occasionally seen gathered in flocks about some carcass. Very beneficial and should never be killed.

Family FALCONIDÆ. Hawks, etc.

Mostly large, powerful birds, feeding on mammals, birds or fish killed by themselves; or insects in the case of some of the smaller or more sluggish species. A few species are injurious through capturing poultry or game birds, but the majority prey on mice or other noxious animals and should be thoroughly protected. The general practice of shooting all hawks and owls cannot be too strongly condemned. Kill no predaceous bird not positively known to be harmful.

135. WHITE-TAILED KITE. **Elanus leucurus.**

Formerly occasional residents, now very rare or completely exterminated in this county. The food is mice, lizards, snakes, grasshoppers, etc.

136. MARSH HAWK. **Circus hudsonius.**

Common residents of the valleys, where they hunt over meadows, grassy valleys and marshes. They prey on meadow mice almost exclusively.

137. SHARP-SHINNED HAWK. **Accipeter velox.**

Rather common fall, winter and spring residents. This active little Hawk is the terror of small birds, on which it principally preys, but it catches some poultry and many quail. It is able

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to carry off quail or young poultry heavier than itself. It is one of the few hawks that should be killed whenever possible.

138. COOPER HAWK. **Accipeter cooperi.**

Rather common winter residents of the valleys. Occasional summer residents and breed in the mountains. Very destructive of poultry and game birds. This is the Hawk principally responsible for the bad name given all hawks. It deserves no mercy.

138a. WESTERN GOSHAWK. **Astur atricapillus striatulus.**

One shot by Rudolph Wueste at the Lower Otay Reservoir (about five miles from the Lower California line) November 9. 1916, is now in the Museum of Natural History at San Diego,

139. HARRIS HAWK. **Parabuteo unicinctus harrisi.**

Stragglers from the Colorado valley or Lower California. One shot in Mission Valley now in the Natural History Museum, others have been seen.

140. WESTERN RED-TAILED HAWK. **Buteo borealis calurus.**

Common residents throughout the county, least common in winter. Often called "Chicken Hawk" and "Hen Hawk." Occasionally a young Hawk in its first autumn will catch a chicken, but this rarely happens and after the young Hawk becomes expert in hunting it does not bother poultry, but subsists on ground squirrels, rabbits, mice and grasshoppers, and is far more beneficial than injurious.

141. RED-BELLIED HAWK. **Buteo lineatus elegans.**

Rather rare residents of the valleys, generally only in those containing willow or cottonwood groves. The food is meadow mice, frogs and insects.

142. ZONE-TAILED HAWK. **Buteo abbreviatus.**

Rare stragglers from Lower California. Several have been taken in the county.

143. SWAINSON HAWK. **Buteo swainsoni.**

Rather common summer residents of the valleys and foothills. Migrates in flocks. The food is principally grasshoppers and beetles, with some mice. Never harm poultry. Probably the most beneficial of our hawks. Should never be killed.

144. FERRUGINEOUS ROUGH-LEG HAWK. CALIFORNIA SQUIRREL HAWK. **Archibuteo ferrugineus.**

These large hawks are rather rare winter residents; formerly they were more common. They frequent open valleys and prey on ground squirrels and mice. They are highly beneficial.

145. GOLDEN EAGLE. **Aquila chrysaetos.**

Uncommon residents of foothills and mountains. Food is rabbits, squirrels and waterfowl.

146. BALD EAGLE. **Haliæetos leucocephalus.**

Rare residents of the seacoast and islands. Their food is mostly fish.

147. PRAIRIE FALCON. **Falco mexicanus.**

Rare residents of the foothills. Food mostly squirrels, rabbits, quail, etc. but occasionally poultry.

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148. DUCK HAWK. **Falco peregrinus anatum.**

Rather rare residents of the seacoast and islands. Occasional inland in winter. Preys principally on waterfowl. A powerful falcon, swift of flight and bold.

149. PIGEON FALCON. PIGEON HAWK. **Falco columbarius.**

Rather common winter residents of the valleys and foothills. Their food is principally small birds.

150. RICHARDSON FALCON. **Falco richardsoni.**

Apparently about as common about San Diego as the preceding species. Habits, food and season much the same.

151. SPARROW HAWK. **Falco sparverius.**

Common residents throughout the county. This very small falcon feeds on mice, grasshoppers, beetles, etc. and is beneficial.

152. OSPREY. **Pandion haliætus canadensis.**

Rare residents of the seacoast. More common in the Santa Barbara Islands. Their food is fish.

Family ALUCONIDÆ. Barn Owls.

A small family of rather large owls differing in technical characters from the Strigidæ. Habits, etc. similar. Nocturnal.

153. AMERICAN BARN OWL. **Aluco pratincola.**

Common residents of the valleys and foothills. Often called "Monkey-faced Owls." They frequently inhabit barns and other buildings. They do not harm poultry and should be encourgaed to live about farm premises. The principal item of their food is gophers; they also catch many field mice. Barn Owls are the greatest friend the farmer has among birds.

Family STRIGIDÆ. Horned Owls.

A rather large family of rapacious birds. They vary in size from the large Great Horned Owls to the little bird owls the size of a sparrow. Their food varies in size also, from rabbits to beetles. With but one or two exceptions owls are beneficial and some are among the farmers' best friends. Nocturnal or crepuscular.

154. LONG-EARED OWL. **Asio wilsonius.**

Rather common residents of willow groves in the valleys and of oak forests in the foothills and lower mountains. They like rather thick cover. Their food is almost exclusively injurious rodents.

155. SHORT-EARED OWL. **Asio flammeus.**

Rather rare winter residents of open ground, such as salt marshes along the seacoast, meadows and alfalfa fields and grassy marshes inland. Hide in tufts of grass in the daytime. Often hunt on cloudy days over grass or weeds making cover for mice and gophers. Very beneficial.

156. SPOTTED OWL. **Strix occidentalis.**

Rare residents of oak forests in the foothills and pine forests up to 5,000 feet altitude. Habits but little known.

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157. SOUTHERN CALIFORNIA SCREECH OWL. **Otus asio quercinus.**

Common residents of wooded localities from seacoast to high mountains. Most common in the foothills. The food is mice, beetles and other insects.

158. GREAT HORNED OWL. **Bubo virginianus pacificus.**

Common residents of all parts of the county except the open mesas. This large owl has strength enough to kill and carry away a jack rabbit or a full grown hen. They are the only owls that destroy poultry. Those living in the eastern part of the county along the border of the desert are probably of the subspecies **pallescens.**

159. BURROWING OWL. **Speotyto cuncicularia hypogæa.**

Common residents in open ground from the seashore to the higher foothills. Live in burrows dug by themselves or enlarged from squirrel holes. Hunt principally at twilight. The food is grasshoppers, beetles, mice and gophers.

160. CALIFORNIA PIGMY OWL. **Glaucidium gnoma californicum.**

Rare residents of the mountains, occasionally found in the foothills. This little sparrow-sized owl feeds mainly on insects, but also catches some mice.

Order COCCYGES, Cuckoos, Trogons, Kingfishers, etc.

Family CUCULIDÆ. Cuckoos.

This family contains two distinct groups of birds, the Ground Cuckoos, and the true Cuckoos. The Ground Cuckoos are long of leg, weak of wing and catch their food on the ground. The Cuckoos are strong of flight, inhabit trees and shrubbery and catch their insect prey among the foliage. Both groups have the toes arranged alike, two in front and two behind. The Ground Cuckoos are mostly inhabitants of warm climates, one species coming north into the southwestern United States.

161. ROAD-RUNNER. **Geococcyx californianus.**

Common residents of valleys and foothills. The food is lizards, beetles, grasshoppers, snakes, mice and occasionally the eggs of other birds. They have been known to take young from the nests of other birds and eat them. They run rapidly and spend much of their time on the ground.

162. CALIFORNIA CUCKOO. **Coccyzus americanus occidentalis.**

Summer residents of willow thickets in the valleys. Apparently not very common. As they are very shy they are not often seen. Their food is insects, including a large proportion of caterpillars in season.

Family ALCIDINIDÆ. Kingfishers.

163. BELTED KINGFISHER. **Ceryle alcyon.**

Rather common residents along the seacoast. As their food is fish the Belted Kingfishers are not often seen far from the coast

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in this county. The nests are placed in burrows in banks near water.

Order PICI.

Family PICIDÆ. Woodpeckers.

A large family of wide distribution. The food is varied, but with many species the principal item is wood-boring larvæ, dug from trees in more or less rotten places. Other items of food are ants, beetles and other insects, acorns and other nuts, fruits and seeds.

164. CABANIS WOODPECKER. **Dryobates villosus hyloscopus.**

Rather common residents of wooded localities throughout the county.

165. WILLOW WOODPECKER. **Dryobates pubescens turati.**

Rather rare residents of willow groves. This seems to be about the southern limit of this woodpecker.

166. NUTTALL WOODPECKER. **Dryobates nuttalli.**

Rather common residents in the foothills and lower mountains.

167. WHITE-HEADED WOODPECKER. **Xenopicus albolarvatus gravirostris.**

Rare residents of the higher mountains.

168. RED-BREASTED SAPSUCKER. **Sphyrapicus varius daggeti.**

Occasional winter residents of the foothills and mountains. These woodpeckers drill numerous small holes in the bark of trees in the latter part of the winter and drink the sap that flows from the holes, hence the name.

169. RED-NAPED SAPSUCKER. **Sphyrapicus varius nuchalis.**

Rare winter residents in the foothills.

170. CALIFORNIA WOODPECKER. **Melanerpes formicivorus bairdii.**

Abundant residents in the mountains in oak timber and mixed oak and pine forests. This is the Woodpecker that drills small holes in the bark of trees and drives an acorn in each hole in the fall. This is done to store the acorns for the purpose of eating the acorn meat in the coming winter.

171. LEWIS WOODPECKER. **Asyndesmus lewisi.**

Rather common winter residents of the foothills and mountains. Frequently catches insects on the wing like a flycatcher.

172. RED-SHAFTED FLICKER. **Colaptes cafer collaris.**

Common residents of wooded localities in the coast region and foothills and summer residents in the mountains. Eats many ants, mostly picked up on the ground.

Order MACROCHIRES. Goatsuckers, Swifts, Hummingbirds.

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Family CAPRIMULGIDÆ. Goatsuckers.

A rather small family of long-winged, short-legged, medium sized birds. The food is insects caught on the wing. Nocturnal and crepuscular. Beneficial.

173. DUSKY POORWILL. **Phalænoptilus nuttalli californicus.**

Rather common summer residents of the foothills and mountains. Present in the lower valleys in winter in small numbers.

174. PACIFIC NIGHTHAWK. **Chordeiles virginianus hesperis.**

Occasional in the eastern part of the county in the migrations.

175. TEXAS NIGHTHAWK. **Chordeiles acutipennis texensis.**

Rather common summer residents of the coast region and foothills.

Family MICROPODIDÆ. Swifts.

Small swallow-like birds, and usually confused with swallows, but technically quite different. The flight is very swift. The food is insects caught on the wing. Beneficial. Nests are placed in crevices of rocks or in holes in trees; one eastern species now frequently places its nests in chimmeys.

176. BLACK SWIFT. **Cypseloides niger borealis.**

Rare spring migrants.

177. VAUX SWIFT. **Chætura vauxi.**

Rather common migrant. Similar to the eastern Chimney Swift.

178. WHITE-THROATED SWIFT. **Aeronautes melanoleucus.**

Summer residents, common locally. Present irregularly in winter. Nests in steep cliffs.

Family TROCHILIDÆ. Hummingbirds.

A large family (over 400 species), exclusively American in distribution, and mainly tropical. The smallest known birds are hummingbirds and the largest species are not as large as ordinary sparrows. The food is mostly minute insects, frequently taken from tubular flowers, many species add honey also. The nests are beautiful, warm, thick-walled, often outwardly stuccoed with bits of lichens. The eggs are plain white, two in a set. Some species are quarrelsome and all are fearless. Most species have a variety of notes and some have a low sweet song.

179. BLACK-CHINNED HUMMINGBIRD. **Archilochus alexandri.**

Common summer residents from the coast to the lower edge of the pine forests.

180. COSTA HUMMINGBIRD. **Calypte costæ.**

Common summer residents. Nest preferably on hillsides. A few winter in the foothills at the edge of the Colorado Desert.

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181. ANNA HUMMINGBIRD. **Calypte anna.**

Common winter residents from the sea to the foothills, and present in fall and spring in smaller numbers. After the breeding season in the coast region many migrate to the mountains, remaining there to the end of the season of bloom of flowers.

182. RUFOUS HUMMINGBIRD. **Selasphorus rufus.**

Common spring migrants in the coast region and common late summer and fall migrants in the mountains. None breed here. I took a nest and two eggs in Alaska in June. Quarrelsome, even driving hawks away.

183. ALLEN HUMMINGBIRD. **Selasphorus alleni.**

Rather common spring migrants in the coast region. Common fall migrants in the mountains. Residents in the Santa Barbara Islands.

184. CALLIOPE HUMMINGBIRD. **Stellula calliope.**

Rather common spring migrants through the foothills. Our smallest hummingbird.

Order PASSERES. Perching Birds.

The largest order of birds, containing many families of medium or small sized birds.

Family TYRANNIDÆ. Flycatchers.

A large family of wide distribution. The Flycatchers are of small size. Their food is insects, mostly caught in flight. Some of the species frequent shrubbery; others occur in forests, or in more or less open country where they can watch for passing insects from some perch. All are beneficial, with the exception of certain species that catch honey bees at times.

185. WESTERN KINGBIRD. **Tyrannus verticalis.**

Common summer residents except in the higher mountains. Eats drone bees occasionally.

186. CASSIN KINGBIRD. **Tyrannus vociferans.**

Rather rare residents of the coast region.

187. ASH-THROATED FLYCATCHER. **Myiarchus cinerascens.**

Rather common summer residents of the foothills and lower mountains. Occasional in the coast region. Nests in knotholes in trees.

188. SAY PHŒBE. **Sayornis sayus.**

Common winter residents of the coast region, rare summer residents there but more common in the lower mountains, particularly on the desert slope. Nests are built on ledges of rock walls in canons, usually but a few feet from the bottom.

189. BLACK PHŒBE. **Sayornis nigricans.**

Common residents from the sea to the pine forests. Most often found near water. The nests, made principally of mud, are placed under bridges, on beams in barns, etc.

190. OLIVE-SIDED FLYCATCHER. **Nuttalornis borealis.**

Summer residents of high mountains. Rare in this county be-

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cause of lack of suitable conditions, which are present here only on the summits of Cuyamaca and Palomar. The nests are usually placed on the upper branches of fir trees.

191. WESTERN WOOD PEEWEE. **Myiochanes richardsoni.**

Common summer residents of canons and forests. Migrates through the coast region. Eats bees to some extent.

192. WESTERN FLYCATCHER. **Empidonax difficilis.**

Rather common summer residents of the forests and canons of the foothills and mountains. Migrates through the coast regions.

193. TRAILL FLYCATCHER. **Empidonax trailli.**

Generally distributed in the migrations. Rather common residents of willow thickets, principally in the lower valleys.

194. HAMMOND FLYCATCHER. **Empidonax hammondi.**

Rather common migrants in the spring through the lower part of the county, in the fall through the mountains also.

195. WRIGHT FLYCATCHER. **Empidonax wrighti.**

Rather common migrants in the foothills and mountains and breed in small numbers in the higher mountains.

196. VERMILLION FLYCATCHER. **Pyrocephalus rubineus mexicanus.**

Rare winter stragglers from the Colorado valley.

Family ALAUDIDÆ. Larks.

A small family of small birds, widely distributed in the north temperate and arctic zones. They are represented in America by the introduced skylark and one native genus. The food is insects. They are mostly ground dwellers. Beneficial.

197. CALIFORNIA HORNED LARK. **Otocoris alpestris actia.**

Abundant residents of valleys and plains. They run about on the ground picking up insects and are often seen in the roads. The nests are placed on the ground under weeds or grass. They frequently sing while fluttering high in the air like a skylark.

198. MOHAVE HORNED LARK. **Otocoris alpestris ammophila.**

Winter residents of mountain valleys, usually in flocks mixed with the preceding subspecies.

Family CORVIDÆ. Crows, Jays and Magpies.

A rather large-sized family of wide distribution. The birds are of medium or rather large size. They perch on trees or walk or hop around on the ground as occasion arises in hunting for food. The food is almost anything eatable either animal or vegetable. Some of the species are beneficial but the balance in general turns the other way.

199. BLUE-FRONTED JAY. **Cyanocitta stellari frontalis.**

Common residents of the pine forests, occasionally descending in winter to the oak forests. Usually seen in companies of half a dozen or so. Noisy. Wary.

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200. CALIFORNIA JAY **Aphelocoma californica.**

Common residents of wooded localities from the coast to the lower edges of the pines. Sometimes troublesome about farm yards near brush by eating hens' eggs. Sometimes eat the eggs and young from the nests of other birds.

201. RAVEN. **Corvus corax sinuatus.**

Generally distributed through the county in open ground. Now not often seen in the more thickly settled parts of the county.

202. WESTERN CROW. **Corvus brachyrhynchos hesperis.**

Rather common residents, but local. They nest in willow groves and are more often seen near willows all the year. They do not seem to pull up young corn much in this county, and generally do more good than harm.

203. CLARKE NUTCRACKER. **Nucifraga columbiana.**

Transient winter visitants to the eastern slope of the mountains.

204. PINON JAY. **Cyanocephalus cyanocephalus.**

Irregular winter visitants in the pinon and juniper groves on the desert slopes of the mountains. Go in flocks, sometimes of considerable size.

205. NEVADA COWBIRD. **Molothrus ater artemesiæ.**

Stragglers or rare migrants in the desert along the eastern edge of the county.

Family ICTERIDÆ. Troupials, Orioles.

A large family, peculiar to America, and most abundant in South America. Some species are arboreal, others are terrestrial and some inhabit reeds and tules in swamps. The habits are quite varied, as also is the food and the quality of the song.

206. DWARF COWBIRD. **Molothrus ater obscurus.**

Rare stragglers. Have been taken at San Diego.

207. YELLOW-HEADED BLACKBIRD. **Xanthocephalus xanthocephalus.**

Common migrants and breed in small colonies in tule marshes. Occasional elsewhere.

208. SAN DIEGO REDWING BLACKBIRD. **Ægelaius phœniceus neutralis.**

Abundant migrants. Common summer residents in tule marshes. Irregularly common locally in winter. Sometimes destructive of grain crops, but beneficial at other times.

209. TRICOLOR BLACKBIRD. **Ægelaius tricolor.**

Formerly abundant winter residents and locally common summer residents of tule marshes. Now less common. More abundant north in the San Joaquin Valley. Habits similar to those of the preceding species.

210. WESTERN MEADOWLARK. **Sturnella neglecta.**

Abundant winter residents and common summer residents of valleys throughout the county. While the species is present throughout the year the winter residents go north in spring and are replaced by others coming from Mexico. Fine songsters. Not true larks, which belong in another family.

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211. SCOTT ORIOLE. **Icterus parisorum.**

Rather common spring migrants in the eastern part of the county and probably breed there in the foothills at the edge of the desert. Rare summer residents at San Diego. Have a sweet song.

212. ARIZONA HOODED ORIOLE. **Icterus cucullatus nelsoni.**

Common summer residents from the seacoast to about 3,000 feet altitude. Preferably nest in palm trees.

213. BULLOCK ORIOLE. **Icturus bullocki.**

Common residents of all wooded localities from the seacoast up to the pine forests.

214. BREWER BLACKBIRD. **Euphagus cyanocephalus.**

Abundant residents in most of the valleys of the county. Often seen in parks and on lawns in the city.

Family FRINGILLIDÆ. Sparrows.

This is the largest and best known family of birds. Of world wide distribution, and occur in all kinds of localities except on water, in fact, wherever seeds may be found. The food is seeds, buds, leaves and fruit, with more or less insects added by many species. An occasional species does some harm to fruit or grain at times, but many species are beneficial in eating quantities of weed seeds. Most species have a pleasant song. Some species are ground dwellers; others live in trees; many inhabit shrubs. In fact any kind of location furnishing sufficient food may have its peculiar species of sparrow inhabitant.

215. CALIFORNIA PURPLE FINCH. **Carpodacus purpureus californicus.**

Rather rare summer residents of pine forests. Irregular winter residents of the valleys and mesas.

216. HOUSE FINCH. "LINNET." **Carpodacus mexicanus frontalis.**

Abundant residents throughout the county. Sometimes destroys peaches and other fruits and grain.

217. WILLOW GOLDFINCH. **Astragalinus tristis salicamans.**

Rather common residents of the valleys; in summer principally found around willow thickets.

218. GREEN-BACKED GOLDFINCH. **Astragalinus psaltria hesperophila.**

Common residents. In summer most common in valleys in the foothills, in winter generally distributed but most plentiful in the lower valleys and mesas.

219. LAWRENCE GOLDFINCH. **Astragalinus lawrencei.**

Rather common summer residents of the foothills and mountains. Irregular winter visitants. Some winters none are seen.

220. PINE SISKIN. PINE LINNET. **Spinus pinus.**

Rather common spring migrants in wooded regions. May breed in the highest mountains, but I know of no breeding record for the county.

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252. CALIFORNIA BLUE GROSBEAK. **Guiraca caerulea salicarius.**

Rather common summer residents of valleys in the foothills.

253. LARK BUNTING. **Calmospiza melanocorys.**

Casual spring migrants in the coast region. Usually migrate in flocks.

Family TANGARIDÆ. Tanagers.

A family of rather small birds confined to America and most numerous in the tropics. The males are brightly colored but the females are comparatively plain. The food is insects and fruit.

254. WESTERN TANAGER. **Piranga ludoviciana.**

Common, but irregular, spring migrants throughout the county. Rare summer residents in the highest mountains. Occasionally the migrating birds do considerable damage to cherry crops.

Family HIRUNDINIDÆ. Swallows.

A rather large family of small birds, cosmopolitan in distribution. The food is exclusively insects, caught while on the wing. Very few remain in temperate climates through the winter. Very beneficial.

255. WESTERN MARTIN. **Progne subis hesperia.**

Infrequent or irregular summer residents of timbered localities.

256. CLIFF SWALLOW. **Petrochelidon lunifrons.**

Common to abundant summer residents of suitable localities throughout the county.

257. BARN SWALLOW. **Hirundo erythrogaster.**

Infrequent summer residents along the seacoast.

258. TREE SWALLOW. **Iridoprocne bicolor.**

Rather common migrants. Infrequent summer residents of the coast region.

259. NORTHERN VIOLET-GREEN SWALLOW. **Tachycineta thalassina lepida.**

Common migrants. Breed in small numbers in the mountains in knot holes of trees.

260. BANK SWALLOW. **Riparia riparia.**

Rather common migrants.

261. ROUGH-WING SWALLOW. **Stelgidopteryx serripennis.**

Rather common migrants and breed in small numbers in the coast region.

Family BOMBYCILLIDÆ. Waxwings.

A small family inhabiting the temperate and arctic zones of the northern hemisphere. They are small birds, frequenting trees and shrubbery. The food is soft fruits and insects. Occasionally they eat cultivated fruits. Songless.

262. CEDER WAXWING. **Bombycilla cedrorum.**

Irregular winter residents. Occasionally appear in considerable numbers.

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Family PTILOGONATIDÆ. The Silky Flycatchers.

A small family inhabiting Central America and Mexico, with one species in the United States. Their food is insects and berries.

263. PHAINOPEPLA. **Phainopepla nitens.**

Rather common summer residents and occasionally seen in winter. Their food is insects and such fruits as pepper tree berries and mistletoe berries. Not known to eat cultivated fruits. The insects are caught flycatcher fashion.

Family LANIIDÆ. Shrikes.

A rather small family restricted to the northern hemisphere and represented in America by but two species. The food is large insects, small mammals, reptiles, etc.

264. WHITE-RUMPED SHRIKE. **Lanius ludovicianus excubitoroides.**

Rather common residents of the eastern slope of the mountains.

265. CALIFORNIA SHRIKE. **Lanius ludovicianus gambeli.**

Common residents from the seacoast to the higher mountains. Tyrannical toward other birds and sometimes in winter catch and eat small birds such as the Intermediate Sparrow. The greater part of the food is insects, such as Jerusalem crickets and grasshoppers; but lizards and small mammals are also eaten. On the whole Shrikes are more beneficial than injurious. A peculiar habit is that of impaling prey not immediately eaten, on thorns, probably in storage, but not often utilized, fresh food being preferred.

Family VIREONIDÆ. Vireos.

A family of small birds inhabiting temperate and tropical America. They frequent shrubs and trees, and feed mainly on insects; one species takes nothing else. The song is usually short but pleasant.

266. RED-EYED VIREO. **Vireosylva olivacea.**

Casual. One specimen has been taken here.

267. WESTERN WARBLING VIREO. **Vireosylva gilva swainsoni.**

Common summer residents in the mountains and common in the migrations in the coast region. Nests in oak forests.

268. CASSIN VIREO. **Lanivireo solitarius cassini.**

Generally distributed in the migrations. Rather common summer residents of timbered canons in the mountains.

269. HUTTON VIREO. **Vireo huttoni.**

Infrequent winter residents and occasional in summer.

270. LEAST VIREO. **Vireo belli pusillus.**

Common summer residents of willow thickets.

271. GRAY VIREO. **Vireo vicinior.**

Summer residents of thick brush on mountain sides. Local in distribution, occasionally rather common.

Family MNIOTILTIDÆ. Wood Warblers.

This large family is American in distribution. The greater

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berries and the pulpy seeds of poison oaks also. They eat many grasshoppers and other injurious insects. Probably the beneficial items of food overbalance the injurious ones. Their songs are partly composed of imitations of the songs of other birds, but a considerable part is their own, which is so varied that most people think it is also mimetic.

291. PASADENA THRASHER. **Toxostoma redivivum pasadenense.**

Common residents of brushy localities from the seacoast to the pine region. The food is insects and seeds in about equal quantities. Occasionally where a vineyard is bordered by brushland the birds come in from the brush and eat some grapes. They are fine singers, but do not imitate other birds.

292. LECONTE THRASHER. **Toxostoma lecontei.**

Rare or infrequent residents of the desert and foothills of the eastern part of the county. Taken by me in the San Felipe Valley ten miles east of Julian.

Family TROGLODYTIDÆ. Wrens.

A large family of small birds of world wide distribution, but most abundant in the American tropics. They are found in a variety of localities, such as thick underbrush in forests, shrubbery, tulle swamps, cactus patches, etc. The food is principally insects. The species found in cool climates are migratory. Many species are fine singers. Beneficial.

293. NORTHERN CACTUS WREN. **Heleodytes brunneicapillus couesi.**

Rather common locally in cactus thickets in the eastern part of the county.

294. BRYANT CACTUS WREN. **Heleodytes brunneicapillus bryanti.**

A considerable proportion of the Cactus Wrens living in the region from the seacoast to the foothills are **bryanti**. Others are **couesi**, while some are probably intermediates; material is lacking for positive determination. Formerly Cactus Wrens were abundant in the "cholla" cactuses, but persistent egg collecting by boys has nearly exterminated them. The big nests in the cactuses were too easily found.

295. ROCK WREN. **Salpinctes obsoletus.**

Common summer residents of canons and rocky hillsides throughout the county. Occasional in winter.

296. DOTTED CANON WREN. **Catherpes mexicanus punctulatus.**

Rather common residents of rocky hillsides and canons in the foothill region. Sweet singers. Fearless and occasionally enter open windows.

297. SAN DIEGO WREN. **Thryomanes bewicki charienturus.**

Common residents of brushy localities. In winter they come down from the higher mountains, and in summer most of them leave the coast region.

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298. WESTERN HOUSE WREN. **Troglodytes ædon parkmanni.**

Common summer residents of the foothills and mountains. A few winter in the coast region.

299. TULE WREN. **Telmatodytes palustris paludicola.**

Rather common residents on tule swamps.

Family CERTHIDÆ. Creepers.

This is a small family living in the cooler parts of the northern hemisphere. They are restless little birds, found in forests, where they creep over the trunks of trees, picking insects from the crevices of the bark. Scarcely migratory.

300. SIERRA CREEPER. **Certhia familiaris zelotes.**

Infrequent residents of the coniferous forests of the higher mountains.

Family SITTIDÆ. Nuthatches.

A small family of wide distribution. The birds are small, active, expert climbers, running over the trunks and limbs of trees frequently head downward (which no other birds do habitually), searching the crevices in the bark for insects. They feed to some extent on seeds and nuts which they stick in cracks in the bark and hammer until broken, hence the name "Nuthatches," (nut-hack).

301. SLENDER-BILLED NUTHATCH. **Sitta carolinensis aculeata.**

Common residents of coniferous forests, coming lower down in winter.

302. PYGMY NUTHATCH. **Sitta pygmaea.**

Common residents of coniferous forests. Occasional in the foothills in winter. Usually seen in small flocks.

Family PARIDÆ. Titmice and Chickadees.

A rather large family inhabiting the northern hemisphere, most abundant in Europe and Asia. They are hardy birds and migrate but little. Usually seen in small flocks.

303. SAN DIEGO TITMOUSE. **Bæophilus inornatus murinus.**

Rather common residents of forests in the foothills and mountains. Not as gregarious as most members of this family. These Titmice eat some fruit, mostly fruit left on the trees in fall and winter, but they also eat many scale insects.

304. MOUNTAIN CHICKADEE. **Penthestes gambeli baileyæ.**

Rather common residents of coniferous forests, some descending to the oaks in winter.

305. LEAST BUSH-TIT. **Psaltriparus mimimus.**

Common residents of brushy localities from the seacoast to the pines. Usually seen in small flocks of half a dozen to a dozen. The nest is purse-shaped and large for so very small a bird.

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306. VERDIN. **Auriparus flaviceps.**
Infrequent residents of mesquit thickets on the eastern slope of the mountains.

Family CHAMÆIDÆ. Wren-tits.

Probably the smallest family of birds, as it contains but one species, including several subspecies. The distribution is the seacoast and western slope of the mountains from northern Lower California to southern Oregon, a strip of country about 800 miles long by 10 to 100 wide.

307. PALLID WREN-TIT. **Chamæa fasciata henshawi.**
Common residents of chemisal and other brush thickets. Shy and difficult to see. The food is seeds and insects.

Family SYLVIIDÆ. Warblers, Kinglets, Gnatcatchers, etc.

A large heterogenous family most numerous in Europe and Asia. The birds are all small, those members of the family found here being scarcely larger than hummingbirds. The food is insects.

308. WESTERN RUBY-CROWNED KINGLET. **Regulus calendula cineraceus.**
Rather common winter residents of forests and groves. Rare summer residents of the highest mountains. The song is loud for so small a bird.

309. WESTERN GNATCATCHER. **Polioptila cærulea obscurus.**
Common summer residents of brush and forests in the foothills and mountains and common in winter in the lower country. The food is insects, mostly small species.

310. BLACK-TAILED GNATCATCHER. **Polioptila californica.**
Rather common local residents of brush from the seacoast to the foothills. Rare winter residents.

311. PLUMBEOUS GNATCATCHER. **Polioptila plumbea.**
Infrequent winter residents of the eastern slope of the mountains.

Family TURDIDÆ. Thrushes, etc.

A large cosmopolitan family of rather small birds. The species living in summer in cool climates migrate, usually in loose flocks. The food is varied and includes insects, seeds and fruit. Many species are good singers.

312. TOWNSEND SOLITAIRE. **Myadestes townsendi.**
Infrequent migrants and rare winter residents.

313. RUSSET-BACKED THRUSH. **Hylocichla ustulata.**
Rather common summer residents of brush along streams and in wet places in the foothills.

314. ALASKA HERMIT THRUSH. **Hylocichla guttata.**
Common winter residents in brush from the seacoast to the foothills.

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315. MONTEREY HERMIT THRUSH. **Hylocichla guttata slevini.**

Infrequent winter residents in brush in the coast region. Rare migrants in the mountains.

316. SIERRA HERMIT THRUSH. **Hylocichla guttata sequoiensis.**

Rare winter residents in the mountains and infrequent migrants.

317. WESTERN ROBIN. **Planesticus migratorius propinquus.**

Irregular late winter visitants, sometimes abundant, but more often fail to get this far south.

318. NORTHERN VARIED THRUSH. **Ixoreus nævius meruloides.**

Occasional winter visitants, sometimes in numbers, to the coast region.

319. WESTERN BLUEBIRD. **Sialia mexicanus occidentalis.**

Common winter residents. A few breed in the mountains.

320. MOUNTAIN BLUEBIRD. **Sialia curracoides.**

Rather common winter residents on the mesas from the coast to the foothills.

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AN ANNOTATED LIST OF THE MAMMALS OF SAN DIEGO COUNTY, CALIFORNIA

By FRANK STEPHENS

Transactions, San Diego Society of Natural History
Vol. 3, No. 3. Pp. 41—56
April 20, 1921

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AN ANNOTATED LIST
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By FRANK STEPHENS

Order Cetacea

Cetaceans are mammals that are fishlike in form and adapted for life in oceans, seas and large rivers. Like all mammals they breathe by means of lungs and suckle their young, which are born well developed.

Family BALÆNIDÆ. Whalebone Whales.

The food is zoophytes, mollusks, crustaceans and small fish. When a quantity of these are taken into the mouth the accompanying water is strained out through the fringed "balleen" of the upper jaw, the mouth being partially closed. Whales of this family have no teeth.

1. CALIFORNIA GRAY WHALE. **Rhachianectes glaucus.**
Formerly common, now infrequent or nearly extinct. Migrate up and down the coast, at times within sight from the land. Seen here from November until April. Hunted for their oil, which averages about twenty barrels to the whale. The flesh is beginning to be utilized for food.
2. PACIFIC HUMPBACK WHALE. **Megaptera versabilis.**
Nearly exterminated. Migrate irregularly.
3. SULPHUR-BOTTOMED WHALE. **Sibbaldius sulfureus.**
The largest species of whale. Swift and difficult to capture. Not common. Migrate irregularly.
4. PACIFIC FINBACK WHALE. **Balænoptera velifera.**
Occasional along the coast.

Family PHYSETERIDÆ. Sperm Whales.

The food is squid, cuttlefish, octopus, etc. Teeth in lower jaw.

5. SPERM WHALE. **Physeter macrocephalus.**
Found in temperate and tropical seas. Now almost exterminated.

Family DELPHINIDÆ. Dolphins, Porpoises, etc.

The food is fish, squid, cuttlefish, etc. Gregarious and voracious. But little is known about the habits of these small cetaceans. Usually there are teeth in both jaws.

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6. NORTHERN RIGHT WHALE PORPOISE. **Lissodelphis borealis.**

Rather common. Sometimes enter bays.

7. BAY PORPOISE. **Phocæna communis.**

The Bay Porpoises seem to prefer brackish waters, where rivers enter the ocean and therefore are not common here.

8. BLACKFISH. **Globicephala scammoni.**

Formerly common off the coast; now this large porpoise is seldom seen.

9. GRAMPUS. **Grampus griseus.**

10. COWFISH. **Tursiops gilli.**

Occasional along the coast. Said to have entered bays formerly.

11. STRIPED PORPOISE. Striped Dolphin. **Lagenorhynchus obliquidens.**

Rather common near the coast and occasional in bays.

12. COMMON DOLPHIN. **Delphinus delphis.**

Rather common near the coast and occasional in bays.

Order UNGULATA.

Family CERVIDÆ. Deer.

But one native species of this family occurs in this county now. It is possible that elk may have once ranged this far south but I know of no records of their occurrence here.

13. CALIFORNIA MULE DEER. **Odocoileus hemionus californicus.**

Still fairly common in the mountains. If the laws regarding close seasons and number limits are honestly obeyed there will always be fair deer hunting in this county, as there is a large area of brush land and forest that will never be put in cultivation and will be good deer range.

Several Dwarf Elk have been turned out in the Laguna Game Preserve, but they may not be able to establish themselves.

Family ANTILOCAPRIDÆ. Prong-horn Antelopes.

14. PENINSULA PRONG-HORN ANTELOPE. **Antilocapra americana peninsularis.**

Now practically extinct in this county. Not long ago they ranged along the edge of the Colorado Desert in the eastern part of this county. Many years ago I saw four at Carrizo Creek. I have heard that when the first settlers came to this county Antelopes were found on the mesas near the seacoast.

Family BOVIDÆ. Cattle, Sheep, etc.

15. NELSON BIGHORN. Mountain Sheep. **Ovis canadensis nelsoni.**

While not as common as they were twenty years ago Bighorns are still to be found on the mountain sides of the desert slope, and now appear to be slowly increasing in numbers.

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Order RODENTIA. Gnawing Animals.

Family SCIURIDÆ. Squirrels.

This is a large family of rather small-sized animals. Squirrels are found in nearly all parts of the world except Australia. Some species are used for food. Some species are of economic importance because of their destruction of crops. The habits are varied; some are arboreal, others are terrestrial; many are fossorial. Most species are diurnal, but the Flying Squirrels are principally nocturnal. The principal food is vegetable,—seeds, fruits, leaves, etc., but some flesh and insects are eaten by many species.

16. FISHERS GROUND SQUIRREL. **Citellus beecheyi fisheri.**

Abundant in the mountains and west to the sea. Not found in the desert or in the foothills bordering the desert. Very destructive to crops and pasturage. Has been found to be infested with the germs of bubonic plague in other counties of this state. Has few redeeming characters.

17. ROUND-TAILED GROUND SQUIRREL. **Citellus tereticaudus.**

Rather common along the edge of the Colorado Desert and in the valleys of the eastern slope of the mountains.

18. ANTELOPE GROUND SQUIRREL. **Ammospermophilus leucurus.**

Common on the eastern slope of the mountains. Prefers rocky ground around the edges of the valleys.

19. MERRIAM CHIPMUNK. **Eutamias merriami.**

Found principally in forests of mixed oak and pine. Common in a few places.

20. ANTHONY GRAY SQUIRREL. **Sciurus griseus anthonyi.**

Found in mixed oak and pine forests on the Laguna, Cuyamaca and Palomar Mountains. They are subject to epidemics and irregular fluctuations in abundance.

I am told that Flying Squirrels have been seen on Palomar Mountain, but I have seen none in the county.

Family MURIDÆ. Rats and Mice.

A very large family of world wide distribution. The introduced species are destructive and harmful, as are a few of the native species in a less degree. The greater number of native species occur mostly at a distance from dwellings and cultivated land and therefore are not of economic importance. Some species are almost exclusively vegetarian, others, particularly the introduced species, are omnivorous.

21. BROWN RAT. **Epimys norvegicus.**

Introduced and thoroughly established. Abundant in towns and becoming common in the country. Very destructive. Sometimes carry disease germs into dwellings.

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22. BLACK RAT. **Epimys rattus.**
Earliest in introduction, but kept reduced in numbers by the stronger Brown Rat.

23. ROOF RAT. **Epimys rattus alexandrinus.**
Introduced. Has not become numerous.

24. HOUSE MOUSE. **Mus musculus.**
Introduced. Abundant.

25. GRASSHOPPER MOUSE. **Onychomys torridus.**
Found in valleys on the eastern slope of the mountains, but nowhere common.

26. RAMONA GRASSHOPPER MOUSE. **Onychomys torridus ramona.**
Found on the mesas and in valleys of the coast region. Not common. Food is insects with some flesh and seeds.

27 GAMBEL WHITE-FOOTED MOUSE. **Peromyscus maniculatus gambeli.**
Common throughout the county. Most abundant in the pine forests. Not often troublesome in dwellings.

28. SONORA WHITE-FOOTED MOUSE. **Peromyscus maniculatus sonoriensis.**
The paler desert form. Common in the eastern part of the county.

29. ROWLEY MOUSE. **Peromyscus boylii rowleyi.**
A mountain species. Common locally.

30. SAN PEDRO MARTIR MOUSE. **Peromyscus truei martirensis.**
Found in the foothills and mountains. Seldom common.

31. CHEMISAL MOUSE. **Peromyscus californicus insignis.**
Found in thick brush from the lower edge of the pine forests to the sea. Common.

32. DESERT MOUSE. Hermit Mouse. **Peromyscus eremicus.**
Abundant in parts of the Colorado Desert and on the eastern slope of the mountains, principally in valleys.

32a. DULZURA MOUSE. **Peromyscus eremicus fraterculus.**
Rather common in brushy localities from the western slope of the mountains to the sea.

33. STEPHENS CAÑON MOUSE. **Peromyscus crinitus stephensi.**
Rare this far south. Found in cañons and valleys on the east slope.

34. LARGE-EARED HARVEST MOUSE. **Reithrodontomys megalotis.**
Occurs in grassy places and weed patches in valleys on the eastern slope of the mountains and along the edge of the desert.

35. LONG-TAILED HARVEST MOUSE. **Reithrodontomys longicaudus.**
Abundant in grass and weeds in the mountains and west to the seacoast.

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36. LONG-EARED BRUSH RAT. **Neotoma fuscipes macrotis.**
Common in brush from the summit of the mountains to the seacoast.
Scarcely or not injurious.
37. INTERMEDIATE BRUSH RAT. **Neotoma intermedia.**
Cholla cactus thickets in foothills and west to the sea.
38. YELLOW BRUSH RAT. **Neotoma intermedia gilva.**
Cactus thickets of the foothills bordering the desert.
39. MESQUITE BRUSH RAT. **Neotoma albigula venusta.**
Colorado Desert and bordering foothills. Frequents mesquite brush.
40. SOUTHERN CALIFORNIA MEADOW MOUSE. **Microtus californicus neglectus.**
Abundant in grassy localities in the mountains and west to the seacoast.

Family GEOMYIDÆ. Pocket Gophers.

The food is vegetable, principally roots and tubers. Stems of plants are also cut off and drawn into the runs. Worms and insects found in the runs are also eaten. Pocket Gophers are quite injurious in cultivated land, especially in fruit orchards. They are easily trapped. Poison and bi-sulphide of carbon are often used in the runs and are moderately effective.
41. TAWNY POCKET GOPHER. **Thomomys nigricans.**
Abundant in the mountains.
42. SOUTHERN POCKET GOPHER. **Thomomys bottæ pallescens.**
Abundant in the foothills and west to the seacoast.
43. IMPERIAL VALLEY POCKET GOPHER. **Thomomys perpallidus albatus.**
Colorado Desert and bordering foothills. Not common in many places.

Family HETEROMYIDÆ. Pocket Rats and Pocket Mice.

Differ from common rats and mice in having pockets in the sides of the neck similar to those of pocket gophers. Sometimes destructive, but not often abundant in cultivated land. Nocturnal. The food is principally seeds. Often called Kangaroo Rats.
45. DULZURA POCKET RATS. **Dipodomys streatori simulans.**
Western slope of the mountains. Not common.
46. BIG DESERT POCKET RAT. **Dipodomys deserti.**
Common in parts of the Colorado Desert and in the bordering foothills. Usually found in small colonies.
47. MIMIC POCKET RAT. **Dipodomys merriami simiolus.**
Abundant in the valleys of the eastern slope of the mountains and in the Colorado Desert.

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48. BANGS' POCKET MOUSE. **Perognathus panamintus bangsi.**

Valleys of the eastern slope of the mountains. Not common.

49. SAND POCKET MOUSE. **Perognathus panamintus arenicola.**

Western border of the Colorado Desert. Rare.

50. PACIFIC POCKET MOUSE. **Perognathus pacificus.**

A very small species. The four known specimens were taken within a mile of the sea in this county.

51. BAILEY POCKET MOUSE. **Perognathus baileyi.**

Eastern slope of the mountains near the border. Rare.

52. LONG-TAILED POCKET MOUSE. **Perognathus formosus.**

Valleys of the eastern slope of the mountains. Not common.

53. TUFT-TAILED POCKET MOUSE. **Perognathus penicillatus.**

Abundant in places in the Colorado Desert and in the valleys of the eastern slope of the mountains.

54. SHORT-EARED POCKET MOUSE. **Perognathus fallax.**

Rather common in the western foothills and thence to the sea.

55. PALLID SHORT-EARED POCKET MOUSE. **Perognathus fallax pallidus.**

Eastern slope of the mountains. Rather common in rocky ground.

56. DARK POCKET MOUSE. **Perognathus californicus femoralis.**

Foothills and western slope of the mountains. Not common.

57. SPINY POCKET MOUSE. **Perognathus spinatus.**

Foothills and low mountains bordering the Colorado Desert. Usually found in rocky places. Seldom common.

Family LEPORIDÆ. Hares and Rabbits.

A rather large family of some economic importance, partly because of the value of their flesh for food, and partly because of the damage occasionally done to crops and fruit trees. Their food is vegetable, mostly the leaves, stems, branches and bark of plants and shrubs, which are bitten off and eaten on the spot. The young of Rabbits are born blind and hairless in underground nests, while those of Hares are well haired at birth and can see and very soon can take care of themselves.

58. SAN DIEGO JACK RABBIT. **Lepus californicus bennetti.**

Common from the sea to the pine forests.

59. COLORADO DESERT JACK RABBIT. **Lepus californicus deserticola.**

More or less common from the eastern slope of the mountains to the Colorado River. This light-colored subspecies is subject

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to severe epidemics, sometimes almost to the extent of extermination.

60. SAN DIEGO COTTONTAIL. **Sylvaticus auduboni sanctidiegi.**

Common from the coast to the pine forests.

61. ARIZONA COTTONTAIL. **Sylvaticus auduboni arizonæ.**

Rather common in places in the foothills bordering the Colorado Desert and east through Arizona.

62. ASHY BRUSH RABBIT. **Sylvaticus bachmani cinerascens.**

Common in thick brush from the coast to the higher mountains. Seldom seen in the open.

Order PINNIPEDIA. Seals.

Family PHOCIDÆ. Earless Seals.

Seals are abundant along Arctic seashores; common along those of temperate regions; less common or wanting along tropical coasts. The food is fish and some crustaceans and mollusks. The fish are caught by pursuit in the water. Seals must come to the surface every few minutes to breathe, and they come ashore occasionally to rest and to bask in the sun.

63. SAN GERONIMO HARBOR SEAL. **Phoca richardi geronimensis.**

Occasional in San Diego Bay and at sea; a small herd stays in Mission Bay. They destroy many fish and in that way are injurious to human interests with but little good to offset the loss.

Family OTARIIDÆ. Eared Seals.

64. CALIFORNIA SEA LION. **Zalophus californianus.**

Occasional along the coast. Prefer the neighborhood of rocky islands, which are lacking near the coast in this county.

Elephant Seals, **Macrorhinus angustirostris,** formerly were abundant on some of the Santa Barbara Islands. I know of no records of any Elephant Seals having been seen on shore within San Diego County but this probably occurred at times when they were still common. The species is very nearly exterminated, a small herd of about a dozen individuals that occasionally comes ashore on Guadaloupe Island being the only known survivors.

Order CARNIVORA. Flesh-eating Mammals.

Family FELIDÆ. Cats.

65. PACIFIC COAST PUMA. "Mountain Lion". **Felis oregonensis.**

Still occasionally found in San Diego County. I have never seen one alive out of a cage. The food is flesh exclusively. Being large and powerful they are able to catch large game, such

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as deer, bighorns, colts, calves and hogs. They kill only for food. Instances of their attacking people are rare and nowadays they avoid men as much as possible.

66. CALIFORNIA BOBCAT. Wildcat. **Lynx eremicus californicus.**

Common in brush and forests throughout the county. They vary greatly with age and season, in color, spotting, and size of ear tuft. Bobcats prey on all the smaller mammals and birds and frequently on poultry. Most of their hunting is done in the night but they prowl around more or less in the daytime.

The Canada Lynx does not occur here.

Family CANIDÆ. Wolves, Dogs and Foxes.

This is a rather large family, distributed over all the world. All are carnivorous, but many species eat other food, such as fruits.

67. VALLEY COYOTE. **Canis ochropus.**

Rather common from the summit of the mountains to the seacoast. Sometimes harmful to poultry and occasionally to sheep and young stock. In the long run this harm is nearly offset by their destruction of gophers, squirrels and mice and by keeping rabbits in check around grain fields, vineyards and orchards. Rather fond of grapes and occasionally troublesome in vineyards. We are apt to remember the harm they do and give them scant credit on the beneficial side.

68. DESERT COYOTE. **Canis ochropus estor.**

Common on the eastern slope of the mountains and on the Desert.

A smaller, brighter colored race (**Canis ochropus mearnsi**) probably occurs in the mountains, but not enough examples are available to decide the point.

69. LONG-EARED KIT FOX. **Vulpes macrotis.**

It is reasonably certain that this Fox formerly occurred in the region between the sea and the mountains, and probably a few still live here.

70. MOHAVE DESERT KIT FOX. **Vulpes macrotis arsipus.**

Occasional in the Mohave Desert and Colorado Desert. I have trapped this pale colored race at Borego Springs in the northeastern part of this county.

71. CALIFORNIA GRAY FOX. **Urocyon cinereoargenteus californicus.**

Common in brush and forest in many parts of the county.

Family PROCYONIDÆ. Raccoons, etc.

A rather small family distributed through temperate and tropical America. The food is small mammals, birds, eggs, fish, insects, fruit and seeds. Nocturnal. Terrestrial and arboreal.

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72. CALIFORNIA RING-TAILED CAT. **Bassariscus astutus raptor.**

Occasionally found in the northern part of the county. Apparently a recent immigrant from further north, as the Indians did not know the animal. The earliest capture that I know of was in 1907, at the southern foot of Palomar Mountain.

73. SOUTHWESTERN RACCOON. **Procyon psora californicus.**

Common from the mountains to the seacoast.

Family URSIDÆ. Bears.

74. CHIEF GRIZZLY. **Ursus magister.**

The type of this species was killed at the head of San Onofre Canon, in the northwestern part of this county, in 1900. He was estimated to weigh 1400 pounds. This is about the largest species of bear known. The species is nearly or quite extinct. Fifty years ago they were rather common in the mountains of this county.

I know of no authentic record of black bears ever having been found in this county.

Family MUSTELIDÆ. Weasels, etc.

This is a rather large and important family of nearly world-wide distribution. The fur of many species is of high quality. Many species are provided with large scent glands, the scent usually being very disagreeable.

75. CALIFORNIA WEASEL. **Mustela xanthogenys.**

Western slope of the mountains and west to the sea. Not common. Beneficial by destroying gophers, mice and squirrels. This species of Weasel seldom kills poultry and should never be killed except individuals known to have acquired the habit of killing poultry.

76. CALIFORNIA SPOTTED SKUNK. **Spilogale phenax.**

Common in the mountains, occasional on the mesas west to the sea. The food is mice, birds, eggs, poultry, insects and grubs. They are bold, having great confidence in their peculiar means of defense. They are good climbers and their small size permits them to enter squirrel holes. They destroy some poultry, some of this destruction being laid to weasels. It is a well established fact that bites of some species of skunks of this genus cause a form of hydrophobia, but cases of hydrophobia from skunk bites in California are not well authenticated.

77. SOUTHERN CALIFORNIA SKUNK. **Mephitis occidentalis holzneri.**

Common throughout the county.

78. WESTERN BADGER. **Taxidea taxus neglecta.**

Generally distributed. Not very common.

79. SOUTHERN SEA OTTER. **Latax lutris nereis.**

Very rare. Sometimes seen in kelp beds.

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AN ANNOTATED LIST OF THE AMPHIBIANS AND REPTILES OF SAN DIEGO COUNTY, CALIFORNIA

By FRANK STEPHENS

Transactions, San Diego Society of Natural History
Vol. 3, No. 4. Pp. 57—69
April 20, 1921

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AN ANNOTATED LIST
OF THE
Amphibians and Reptiles of San Diego County, California

By FRANK STEPHENS

Class Amphibia

Order CAUDATA. Salamanders.

Young salamanders begin life as aquatic animals, breathing by means of gills. Later in life a transformation occurs; the gills disappear and the animal then breathes by means of lungs and are adapted for life on land. The skin is not covered with scales. The limbs are small and comparatively weak. They retain their tails through life.

Family PLETHODONTIDÆ.

1. ARBOREAL SALAMANDER. **Aneides lugubris.**

The only San Diego County occurrences known to me are—Falls of the San Diego River, Sorrento Mountain near La Jolla, and in the Sequoia Mine. Probably more common than these records indicate.

2. SLENDER SALAMANDER. **Batrachoseps attenuatus.**

In wet weather these little lizard-like animals may be found under boards lying on the ground and under stones in the coast region; and in the mountains under rotten logs. In the dry season they burrow in the soil.

Order SALIENTA. Toads and Frogs.

Toads and frogs begin life as aquatic animals (tadpoles), in a manner similar to salamanders, and like them transform from water breathing to air breathing animals; but in the transformation they lose their tails. The limbs, acquired in the transformation, are comparatively long and strong. The food is insects caught on the tip of the protruded tongue. They are principally nocturnal.

Family PELOBATIDÆ.

3. WESTERN SPADEFOOT TOAD. **Scaphiopus hammondi.**

Two San Diego specimens are in the collection of the Natural History Museum; one was taken in May, the other in August.

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Family BUFONIDÆ.

4. CALIFORNIA TOAD. **Bufo borealis halophilus.**

Generally distributed throughout the County except in the Desert.

5. SPOTTED TOAD. **Bufo punctatus.**

Found around springs and in damp places along the edge of the Colorado Desert and on the eastern slope of the mountains.

Family HYLIDAE.

6. PACIFIC TREE FROG. **Hyla regilla.**

Common from the sea to the eastern slope of the mountains. Usually found on the ground. Variable and changeable in colors.

7. ARIZONA TREE FROG. **Hyla arenicolor.**

Common about springs and damp places on the summits and eastern slope of the mountains. Unlike the eastern tree frogs the Californian species do not inhabit trees to any great extent.

Family RANIDÆ.

8. CALIFORNIA RED-LEGGED FROG. **Rana aurora draytoni.**

Common on the western slope of the mountains and west to the sea.

The Yellow-legged Frog, Rana boylii, is found in the San Jacinto Mountains, but has not been reported from this County.

Class Reptilia

Order SQUAMATA.

Suborder SAURIA. Lizards.

Lizards are cold-blooded quadripedal vertebrates that breathe air by means of lungs from birth. Limbs are absent in a few degenerate species. Lizards may be terrestrial, subterranean or arboreal; diurnal, crepuscular or nocturnal in habit. Some species are insectivorous or carnivorous; other are vegetarian; the greater number include both animal and vegetable food in their diet. Many species are oviparous; a few are viviparous. Lizards are most abundant in warm climates.

Family EUBLEPHARIDÆ.

9. BANDED GECKO. **Coleonyx variegatus.**

Found occasionally on the eastern slope of the mountains. Spend the day in crevices of rocks or underground. Nocturnal and insectivorous. Harmless. The scales on the upper surface of the body are smaller than in other families of lizards.

In November, 1920, I captured a specimen of the Warty Gecko, Phyllodactylus tuberculosus, on Coyote Mountain, west-

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ern Imperial county. This species probably occurs also in the foothills of eastern San Diego county.

Family IGUANIDÆ.

This family of lizards is principally tropical in distribution. Many species are very large, some becoming six feet in length; our representatives are comparatively insignificant animals. The species living in the Desert are able to do without water.

10. DESERT IGUANA. **Dipsosaurus dorsalis.**

Common in parts of the Colorado Desert. Herbivorous.

11. GRIDIRON-TAILED LIZARD. **Callosaurus ventralis.**

Common in the Colorado Desert and in the valleys of the eastern slope of the mountains; the food is ants, beetles, grasshoppers, etc.

12. LEOPARD LIZARD. **Crotaphytus wislizeni.**

Occasional in the Colorado Desert and on the eastern slope of the mountains. The food is leaves, blossoms and insects and other lizards.

13. BAILEY COLLARED LIZARD. **Crotaphytus collaris baileyi.**

Occasional on the eastern slope of the mountains. The food is like that of the preceding species.

14. CHUCKWALLA. **Sauromelas ater.**

Found in rocky localities. Not common in this county, but we have specimens from 2,000 feet altitude on the eastern slope of the Cuyamaca Mountains. Herbivorous. Harmless. Sometimes mistaken for the "Gila Monster", which is not found in California.

15. MEARNS LIZARD. **Uta mearnsi.**

Lives among boulders and on the face of cliffs on the eastern slope of the mountains. Not common.

16. DESERT BROWN-SHOULDERED LIZARD. **Uta stansburiana elegans.**

Generally distributed on the eastern slope of the mountains and in the Desert.

17. SOUTHERN BROWN-SHOULDERED LIZARD. **Uta stansburiana hesperis.**

This subspecies is common in Southern California from the sea to the summit of the mountains. The food is flies, beetles, ants, spiders, etc.

18. LONG-TAILED LIZARD. **Uta graciosa.**

Lives in bushes and trees on the eastern slope of the mountains and in the Desert. Food, insects and leaves.

19. VAN DENBURGH LIZARD. **Sceloporus graciosus vandenburghianus.**

Rather common in forests and among rocks in the Laguna. Cuyamaca and Palomar Mountains.

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20. FENCE LIZARD. **Sceloporus occidentalis biseriatus.**
Common throughout the county except the Colorado Desert and in the lower bordering foothills. Food, insects.

21. ROUGH-SCALED LIZARD. **Sceloporus magister.**
Occasional on the eastern slope of the mountains below 3,000 feet altitude. Frequent yuccas, rocks and brush thickets. Food, insects.

22. ORCUTT LIZARD. **Sceloporus orcutti.**
Common from the sea coast eastward part way down the mountains. Found in brush and among rocks.

23. BLAINVILLE HORNED LIZARD. "Horned Toad." **Phyrnosoma blainvillei.**
Common in the coast region, occasional in the mountains. Food, ants, beetles and other insects.

24. DESERT HORNED LIZARD. **Phyrnosoma platyshinus.**
Common in the Colorado Desert and in valleys on the eastern slope of the mountains.

25. FLAT-TAILED LIZARD. **Anota mccalli.**
Colorado Desert and lower part of the valleys in the bordering foothills. Not common.

Family ANGUIDÆ.

26. SAN DIEGO ALLIGATOR LIZARD. **Gerrhonotus scincicaudus webbi.**
Common in the coast region and occasional on the western slope of the mountains. This comparatively slow moving snake-like lizard is harmless, like all lizards living in this county. The food is insects, with occasionally a small lizard of some other species.

Family ANNIELLIDÆ.

Lizards of this family lack legs but rudiments of the pelvic girdle may be found by dissection. The tail is very blunt and the animal looks more like an angleworm than a lizard.

27. SILVERY FOOTLESS LIZARD. **Anniella pulchra.**
Found in a sandy or soft soil throughout the central and western part of the county. Usually burrow in the soil in the daytime. I have found them under boards and stones.

Family XANTUSIDÆ.

A family of quite small lizards having small scales on the upper surface and large ones in conspicuous transverse series on the belly. They are nocturnal.

28. DESERT NIGHT LIZARD. **Xantusia vigilis.**
Rather common in semi-desert localities on the eastern slope of the mountains, mostly under the dead leaves of yuccas and agaves.

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29. HENSHAW NIGHT LIZARD. **Xantusia henshawi.**
Appears to be rare. So far only found in three or four localities on the western slope of the mountains. Not reported from any place outside of this county. Found in crevices of rocks. Crepuscular and nocturnal.

Family TEIIDÆ.

30. DESERT WHIP-TAILED LIZARD. **Cnemidophorus tigris.**
Common in the Colorado Desert. Insectivorous.

31. STEJNEGER WHIP-TAILED LIZARD. **Cnemidophorus tigris stejnegeri.**
Locally common in the mountains and west to the sea.

32. BELDING ORANGE-THROATED LIZARD. **Cnemidophorus hyperythrus beldingi.**
Coast region not common.

Family SCINCIDÆ.

33. WESTERN SKINK. **Plestiodon skiltonianum.**
Usually found lying under boards or stones or among dead leaves. Young individuals have bright blue tails. Principally nocturnal. Insectivorous.

Suborder SERPENTES. Snakes.

Snakes are born with lungs. Limbs are absent. The body is covered with scales. Snakes follow many modes of life; terrestial, arboreal, subterranean, aquatic; diurnal, nocturnal or crepuscular. Progression may be straightforward, by movement of the broad scales of the under surface; by pushing with the back side of the curves of the body and tail; or by a combination of both methods. In cold climates snakes hibernate in winter; in hot climates æstivation may take place in the hotter or drier seasons. They are carnivorous. Snakes are usually oviparous, but a few species are viviparous.

Family LEPTOTYPHLOPIDÆ.

34. WORM SNAKE. **Leptotyphlops humilis.**
Very rare. Two have been found on the eastern slope of the mountains.

Family BOIDÆ.

35. CALIFORNIA BOA. Rubber Snake. **Lichanura roseofusca.**
Not common. Foothills.

36. CALIFORNIA GARTER SNAKE. **Thamnophis ordinoides hammondi.**
Common in most parts of the county, near or in water. Food insects, tadpoles, small fish.

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Family TESTUDINIDÆ. Mud Turtles and Tortoises.

Outer surface covered with horny plates. Feet adapted for walking on land. Size comparatively small.

58. PACIFIC MUD TURTLE. **Clemmys marmorata.**

Occasional locally, in the coast region. There are few suitable streams or ponds in this county where Mud Turtles could live.

The Desert Tortoises have been found in Imperial County and it is possible that they may occur in the northeastern corner of San Diego County.

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TRANSACTIONS
OF THE
SAN DIEGO SOCIETY OF NATURAL HISTORY
VOLUME IV

Palaeozoic Crustacea

Part I—A Bibliography of Palaeozoic Crustacea.

Part II—A List of the Genera and Subgenera of the Trilobita.

Part III—A Summary of the Ordovician Genus Cybele Lovén.

BY
ANTHONY WAYNE VOGDES

SAN DIEGO, CALIFORNIA
PRINTED FOR THE SOCIETY
JUNE 22, 1925

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INTRODUCTION

This series of papers is issued by the San Diego Society of Natural History, San Diego, California, to the Presidency of which, for a period of over fifteen years, its author, the late General Anthony Wayne Vogdes, was elected from year to year until he was allowed to retire at his own request. The principal part is the continuation of a series of bibliographies of Palaeozoic Crustacea which the General has been publishing since 1890. He was in the midst of the preparation of this work at the time of his death in his eightieth year. He died February 8, 1923, after an illness of only two days.

General Vogdes was born in West Point, New York, April 23, 1843. He volunteered as a drummer boy almost at the beginning of the Civil War, gained a second lieutenancy before he was twenty and finished a brevet major "For gallantry and meritorious services during the war." After the War he decided to follow the lead of his father, a general in the Regular Army, and of his great uncle, "Mad" Anthony Wayne of Revolutionary fame, and entered the Army with an officer's commission. He served with distinction and to the satisfaction of his superiors until he was retired a brigadier general on reaching the age limit. It is of record that he carried two books with him through the Civil War, a Bible which his mother had given him and a general work on Geology. It is not now known whether his taste for things geological came from the study of this book or whether the book was secured on account of a taste already acquired, but from that time to the day of his death he was an indefatigable worker along palaeontological lines. Doing his full duty in his chosen profession, he yet found time to make himself an authority on Palaeozoic Crustacea, particularly Trilobites, and to publish a long series of papers on this subject.

Besides this he managed to gather together a library of Geology and Palaeontology, especially of Palaeozoic Crustacea, of over 40,000 titles, as well as a very valuable general library. This includes many full sets of proceedings of scientific societies and many invaluable old editions of scientific works. He once stated at a meeting of the San Diego Society of Natural History that he believed he had everything which had ever been published on the geology of California. Nearly a year's work in this library has convinced the writer that he must have had almost everything which has ever been published on Palaeozoic Crustacea. Fortunately, this library has not been dispersed, but through the generosity of his niece and residuary legatee, Mrs. Stewart Kendall, has been donated to the scientists and public of San Diego for perpetual use. It is deposited in the San Diego Scientific Library, Balboa Park, San Diego.

The library is accompanied by an author and subject catalog of about 40,000 cards, all prepared by the General. He also left an exhaustive

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catalog of Palaeozoic Crustacea with very full references to all the literature on this subject, an estimate of which runs to about 60,000 cards. Besides the bibliographical references, a large portion of the cards carry photographs, mostly from published plates, showing a considerable share of the Crustacea of which they treat. A smaller proportion carry camera lucida drawings from actual specimens or from published plates. In order to do this work the General made himself proficient in photography, just as he made himself an artist in bookbinding in order to give the best of care to the books and pamphlets which he loved with all the ardor of a true bibliophile. He finished binding a set of books two days before his death.

The suddenness and unexpectedness of his death accounts for the fact that the manuscript of the papers here printed was in an unfinished state, needing a very large amount of rearranging, a small amount of cutting down and some correction. No one seemed available who could spare the time without compensation, for which there was no provision, and who possessed the necessary knowledge of the subject to do this work as it should have been done. Therefore, at the solicitation of his associates in the Directorate of the San Diego Society of Natural History, the writer consented to undertake the work, although he had no direct knowledge of the subject except such as he has been able to acquire by studying the manuscript and the remarkable library left by General Vogdes. He wishes to acknowledge much splendid advice and some direct help received from Dr. Charles E. Resser of the National Museum in Washington, but desires to accept full responsibility for such errors as must necessarily be evident to specialists who are familiar with the subjects of which the publication treats.

FRED BAKER.

Point Loma, California,
July 25, 1924.

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PART I.

A BIBLIOGRAPHY OF PALAEOZOIC CRUSTACEA, SUPPLEMENTING THE AUTHOR'S PREVIOUS PAPERS ON THE SAME SUBJECT*

(Arranged Alphabetically by Authors)

AGNUS, ———. *Palaeoblattina douvillei,* considerée d'abord comme un Insect, est une Pointe génale de Trilobite.—Comptes-rendus, Acad. Sci., Paris, Vol. 138, 1904, pp. 398-399.

ASSELBERGS, E. Description d'une Fauna Frasnieni Inférieure du Bord Nord du Bassin de Namur.—Bull. Soc. Belge Géol. Brux., Vol. 26, 1912, Mémoires, pp. 1-47, plates 1-6.

Bronteus flabellifer Goldf.

Cryphaeus punctatus Stein.

Dechenella verticalis.

——— Description des Fossiles découverts par M. J. Duvigneaud aux Environs de Neufchateau.—Bull. Soc. Belge Géol. Brux., Vol. 26, 1913, Mémoires, pp. 189-215, figs., pl. 8.

Homalonotus sp.

Cryphaeus drevermanni Richter.

This is the *Cryphaeus laciniatus* Drevermann, Palaeontogr., pl. 49, p. 74, 1902, which Richter referred to a new species. The generic name *Cryphaeus* Green, 1837, was pre-occupied in Coleoptera in 1833 and Corda's generic name *Asteropyge* should take its place.

——— Le Dévonien Inférieur du Bassin de l'Eifel et de l'Anticlinal de Givonne dans la région Sud-Est de l'Ardenne, Belge.—Mémoires Inst. Géol. Univ. Catholique de Louvain, Tom. 1, Mém. 1, 1913.

Arthropoda, p. 121.

Homalonotus planus Sandb., Sud du Bassin de Dinant; *H. ornatus* Koch, Sud de Martelange; *H.* cf. *multicostatus* Koch, Ardoisies de Warmifontaine.

Phacops ferdinandi Kayser, characteristique des Hundsrückschiefer sur le Rhin.

Dalmania (*Odontochile*) cf. *spinifera* Barr., Hundsrückien inférieure de Martelange.

Cryphaeus drevermanni Richter; *C. sp.*

Proetus sp.

---

*1. "A Bibliography of Palaeozoic Crustacea from 1698 to 1889, including a list of North American species and a systematic arrangement of genera." U. S. Geological Survey Bulletin No. 63, Washington, D. C., 1890.

2. "A Classed and Annotated Bibliography of the Palaeozoic Crustacea from 1698 to 1892, to which is added a catalogue of North American species." Occasional Papers IV, California Academy of Sciences, San Francisco. Calif., June, 1893.

3. "Supplement of Bibliography of Palaeozoic Crustacea." Proceedings, California Academy of Sciences, Vol. V, pp. 53-76, San Francisco, Calif., 1895.

4. "Palaeozoic Crustacea. The publications and notes on the genera and species during the past twenty years, 1895-1917." Transactions, San Diego Society of Natural History, Vol. III, No. 1, San Diego, Calif., 1917.

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BARBOUR, ERWIN H. Eurypterid Beds of Nebraska with Notice of a New Species, *Eurypterus nebraskensis*.—Geol. Sur. of Nebraska, Vol. 4, Part 12, 1914, p. 201, figs. 3 and 4.

Eurypterus sp., p. 202, fig. 5.

The Eurypterids of Nebraska are small, the average being a little over 40 mm. in length.

Preabdomen slightly inflated and blending gradually into the postabdomen, giving a vermiform appearance; telson long and slender; scale markings distinct and very regular in pattern over the tergites.

The new species may be placed in the *Eurypterus stylus* Hall group.

BARROIS, C. See GOSSELET, J. A. A.

BASSLER, R. S. Crustacea.—Geol. Sur. of Maryland, Cambrian and Oddovician, 1919, pp. 332-373, pl. 24, 26, 27, 32, 33, 47, 48, 51, 52, 55 and 58.

The following species described and illustrated:

Eoharpes ottawaensis Billings

Cryptolithus bellulus (Ulrich); *C. recurvus* Ulrich, sp. nov.; *C. tesselatus* Green.

Ampyx (*Lonchodomus*) *normalis* (Billings); *A.* (*Lonchodomus*) *halli* (Billings).

Dolichometopus sp.

Hystricurus conicus (Billings).

Goniurus caudatus (Billings).

Triarthrus fischeri Billings; *T. becki* Green.

Isotelus stegops Green.

Revived Dr. Green's old name for a species in the Eden shales, compared with *Isotelus maximus*, which it closely resembles. The species has the eye further forward, smaller spines, and the flattened border, especially of the pygidium, less distinct.

Isotelus megistos Locke.

Bassler remarks that under the name of *Isotelus megistos* and also *Isotelus maximus* and *I. gigas* a number of distinct species, ranging through the Mohawkian and Cincinnatian, have undoubtedly been confused, with the result that these names have little stratigraphic significance.

Formerly the separation of the species was based upon the presence or absence of the genal spine, but it is now known that each species contains spinous and aspinous forms, the difference between the two being presumably that of sex.

The aspinous (?female) forms of these several species are quite difficult to distinguish from each other, but the spinous examples show good characters of differentiation. Thus in the case of *I. maximus* and *I. megistos*, long considered synonymous, the free cheeks of each are different. In *I. megistos* the base of the spine is much wider and it tapers much more rapidly.

The hypostoma furnishes further differences, for in *I. megistos* it shows coarser venations, the inner edges of the limb are straighter, and the whole hypostoma is relatively longer.

Isotelus gigas DeKay; *Isotelus sp.*

Asaphellus gyracanthus Raymond.

Hemigyraspis collieana Raymond.

Symphysurus convexus (Cleland).

Onchometopus simplex Raymond and Narraway.

Illaenus americanus Billings.

Bumastus trentonensis Emmons.

Saukia stosei Walcott.

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Proetus latimarginatus Weller.
Cyphaspis matutina Ruedemann.
Amphilichas trentonensis (Conrad).
Acidaspis ulrichi sp. nov.
Calymene granulosa (Foerste); *C. senaria* Conrad.
Ceraurus pleurexanthemus Green.
Pliomerops salteri (Billings).
Pterygometopus callicephalus (Hall).
Order Notostraca: *Ribeiria* (?) *nuculitiformis* Cleland.
Suborder Ostracoda: *Isochilina gregaria* (Whitfield); *I. seelyi* (Whitfield).
Leperditia fabulites (Conrad).
Leperditella tumida (Ulrich).
Aparchites minutissimus (Hall).
Drepanella macra Ulrich.
Macronotella ulrichi Ruedemann.
Ceratopsis chambersi (Miller).
Ulrichia bivertex (Ulrich).
Bythocypris cylindrica (Hall).
Suborder Cirripedia: *Lepidocoleus jamesi* (Hall & Whitfield).
Suborder Malacostraca: *Caryocaris silicula* sp. nov.

BEUHAUSEN, L. VON. Ueber Hypostome von Homalonoten.—Jahrbuch der Königl. Preuss Geol. Landesanstalt für 1891, pp. 154-166, 6 figures in text.

The author holds that the hypostomae of the subgenera of *Homalonotus* do not show differences of taxonomic value. He illustrates the forked hypostoma of *Homalonotus bohemicus* Barr., which resembles very much that of *Calymene*. The other illustrations of hypostomae are those of *H. knighti, H. delphinocephalus, H. dekayi, H. armatus* and *H. rhenanus*.

The species represented are placed by Reed under subgenera as follows: *Homalontus* (*Echomalonotus*) *bohemicus, H.* (*Dipleura*) *dekayi, H.* (*Trimerus*) *delphinocephalus, H.* (*Koenigia*) *knighti,* and *H.* (*Digonus*) *rhenanus*.

BEYER, S. Beiträge zur Kenntniss der Fauna des Kalkes von Haina bei Waldgirnes (Wetzlar).—Verhandl. Nat. für Rheinl. & Westfalen, Vol. 53, Jahrg., 1896, pp. 56-102, 3 plates.

Trilobita: *Proetus subplanatus* Maurer, p. 59, pl. 1, figs. 1-5; *P. quadratus* Maurer, p. 58, pl. 1, figs. 7-11; *P. suborbitatus* Hzl., p. 63, pl. 1, fig. 12; *P. crassimargo* Röm., p. 63, pl. 1, fig. 14.

Tropidocoryphe novaki sp. nov., p. 65, pl. 1, figs. 16-22.

Cyphaspis hainensis sp. nov., var. nov., p. 66, pl. 1, figs. 23-25.

Acidaspiss radiata Goldf., p. 66, pl. 1, fig. 28.

Lichas granulosus (?) Roem., p. 67, pl. 1, fig. 27.

Bronteus granulatus (?) Goldf., p. 67, pl. 2, fig. 29.

Cheirurus sternbergi (?) Roem., p. 68, pl. 2, fig. 30.

BJORLYKKE, K. O. Norges Geologiske Undersøgelse Geologisk Kart. Losna. Christiania, Bd. 31, 1885.

BORN, AXEL. Synonymenliste vergl. *Calymene arago* Rouault.—Abhandl. der Senckenberg. Naturf. Ges., Bd. 36, 1916, p. 351.

————Zur organisation der Trilobiten: 1. Das Kopfschild von *Chasmops odini* Eichwald.—Senckenbergischen Naturf. Ges., Bd. 1, 1918, pp. 159-171.

Includes 8 text figures of the glabella and hypostoma, compared with those of *Nileus armadillo*.

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BORN, AXEL.—Continued.

——— Eine Untersilurfauna aus den Montagnes noires, (Centralplateau).—Abhandl. der Senckenbergiana, Bd. 3, Heft 6, 1921, pp. 181-193.

Ogygia glabrata Salter.

Trinucleus primitivus sp. nov., p. 191, fig. in text.

Charakteristisch für die Art ist: (1) das Fehlen aller Augen- und Glabellartuberkeln; (2) die auffalend starke präfrontale Verschmälerung resp. seitlich rückwärtige, Verbreiterung des Limbus; (3) die regellose Anordnung der Grübchen an den Limbus; (4) die sehr schmale Glabella, Merkmal 2 und 3 habe ich bei keiner bisher bekannten Art der Gattung feststehen konnen.

Calymene (*Synhomalonotus*) *arago* Rouault.

——— *Calymene tristani* Stufe, (Mittleres Untersilur) bei Almaden, ihre Fauna, Gliederung und Verbreitung.—Abhandl. der Senckenberg. Naturf. Ges., Bd. 36, Heft 3, 1916.

Crustacea:

Beyrichia bussacensis hispanica var. nov., p. 347, pl. 26, fig. 3.

Primitia simplex Jones, p. 347.

Trilobita:

Placoparia tourneminei Rouault, p. 347, pl. 27, fig. 7, a, b.

Calymene tristani Brong., p. 348, pl. 26, figs. 4, a-e; *C. arago* Rouault, p. 351; *C.* (*Pharostoma*) *pulchra* Barr., p. 351.

Homalonotus brongniarti Desl., p. 351.

Cheirurus claviger marianus Vern. & Barr., emend. A. Born, p. 351, pl. 23, fig. 4.

Dalmanites socialis proaeva Emm., p. 352; *D. phillipsi* Barr., p. 352; *D. macrophthalmus* Brong., p. 352, pl. 26, figs. 5, a-c.

Asaphus contractus Vern. & Barr., p. 353; *A. nobilis* Barr., p. 353; *A. nobilis caudiculatus* var. nov., p. 354, pl. 27, figs. 2, a-c; *Asaphus sp.*, p. 354.

Ogygia glabrata Salter, p. 354.

Illaenus giganteus Burmeister, p. 355, pl. 27, figs. 3, a, b.

Illanenus beaumonti Rouault, p. 356, pl. 27, figs. 4, a-c; *I. puer* Barr., p. 356.

Lichas sp., p. 357, pl. 27, fig. 6.

BORNEMANN, J. G. Palaeontologisches aus dem Cambrischen Gebiete vom Canalgrande in Sardinien.—Zeitschr. der Deutschen Geol., Jahrgang 1883, pp. 270-274.

Notes on *Olenellus zoppii, Conocoryphe* and *Illaenus meneghinii.*

BROWN, H. Y. L. Report on Arltunga Gold Field and Hart's Range Mica Field and Explorations North-east of Hart's Range, North-west of Alice Springs and of the Frew River Country, &c. Appendix by R. Etheridge, Jr.—Contributions to the Palaeontology of South Australia, pp. 1-16, 2 plates and 3 geological sketch route maps, Folio, 1897.

Olenellus sp. nov.

The author illustrates a cephalon which bears no relation to any other Australian trilobite and departs from the structure of a large number of American species, such as *Olenellus thompsoni* and *Mesonacis gilberti*, in the continuation of the ocular lobes to the lateral cephalic borders. In this it agrees with some Swedish forms, such as *Holmia kjerulfi*, and also resembles the genus *Protolenus*, but not in any other character.

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BROWNOCKER, J. A., See STAUFFER, CLINTON R.

BURHENNE, H. Beiträge zur Kenntniss der Fauna der Tentaculitenschiefer im Lahngebiet mit besonderer Berücksichtigung der Schiefer von Leun unweit Braunfels.—Abhandl. der Königlich Preuss. Geol. Landesanstalt, N. F., Heft 29, 1899.

Trilobita:

Proetus granulosus Goldf., p. 11, pl. 1, figs. 3-6; *P. cuvieri* Stein, p. 13, figs. 1, 2; *P. holzapfeli* Novak, p. 14, pl. 1, figs. 9-10; *P. lovéni* Barr., p. 15, pl. 1, figs. 7, 8.

Cyphaspis hydrocephala Roemer, p. 16, pl. 1, figs. 11-14; *C. convexa* Corda (?), p. 18, pl. 2, fig. 1.

Acidaspis pigra Barr., p. 18, pl. 2, figs. 7-9.

Bronteus dormitzeri Barr., p. 19, pl. 2, figs. 4, 5; *B. scaber* Goldf., p. 19, pl. 2, fig. 6.

Phacops fecundus Barr., p. 20; *P. fecundus major* Barr., p. 20, pl. 2, figs. 11-13; p. 3, fig. 1; *P. fecundus degener* Barr., p. 21, pl. 3, figs. 2-4; *P. breviceps* Barr., p. 22, pl. 3, figs. 6-7; *P. holzapfeli* sp. nov., p. 22, pl. 3, fig. 5.

Cyphaspis sp., p. 23, pl. 2, fig. 3.

Cryphaeus or *Dalmanites*, p. 23, pl. 2, fig. 2.

Trimerocephalus micromma Roem., p. 23, pl. 3, figs. 8-10. Referred *T. fugitivus* Barr., 1872, pl. 9, fig. 2, also Kayser's figures of Barrande's species, 1878, to *T. micromma*.

Arethusina inexpectata Barr., p. 25, pl. 3, figs. 11-12.

CALMAN, W. T. Crustacea in "A Treatise on Zoology," edited by Sir Ray Lankester, London, 1909.

Calman remarks, page 101, of the Copepoda:

On the hypothesis that the nauplius represents the ancestral type of the Crustacea, the Eucopepoda would be regarded as the most primitive existing members of the class, retaining as they do naupliar characters in the form of the first three pairs of appendages, and the absence of paired eyes and of a shell fold.

As already indicated, however, it is much more probable that they are to be regarded as a specialized and, in some respects, degenerate group, which, while retaining in some cases a very primitive structure of the cephalic appendages, has diverged from the ancestral stock in the reduction of the number of somites, the loss of the paired eyes and the shell fold, and in the simplified form of the trunk limb.

CARPENTER, G. H. On the Relationship between the Classes of Arthropoda. Proc. Roy. Irish Acad., Vol. 24, 1903, pp. 220-360, pl. 6.

The author has tabulated the number of trunk segments of Trilobites, and finds a steady increase throughout the Palaeozoic. His table was based upon very few genera, as follows:

Cambrian, 12 genera. Average number of body segments,.....17.66
Ordovician, 23 genera. Average number of body segments.....18.58
Silurian, 16 genera. Average number of body segments.....19.34
Devonian, 10 genera. Average number of body segments.....20.70
Carboniferous, 2 genera. Average number of body segments.....20.75

CARPENTIER, ABBE ALFRED. Contribution à l'étude du Carbonifère du Nord de la France.—Mém. Soc. Géol. du Nord, Tome 7 (11), 1913, p. 345.

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CHAPMAN, FREDERICK. Preliminary Notes on a Collection of Trilobite Remains from the Dolobrock River, North Gippsland.—Proc. Roy. Soc. Victoria, New Ser., Vol. 21, 1908, pp. 268-269, pl. 11.

A brief notice of Upper Ordovician Trilobites at Dolobrock River, Mt. Wellington District, consisting of the genera *Agnostus, Proetus?*, and a doubtful type, perhaps referable to *Cheirurus*.

——— New or Little-known Victorian Fossils in the National Museum, XII.

——— On a Trilobite of the Upper Cambrian Age, (*Olenus* series) in N. E. Gippsland, Victoria.—Proc. Roy. Soc. Victoria, New Ser., Vol. 23, 1911, pp. 305-324.

Agnostus australiensis sp. nov., p. 314, pl. 58, figs. 9-12.

The form is closely related to *Agnostus pisiformis*, especially in the form of the cephalon, but in the width of the pygidium it is most like the var. *obesus*.

Ptychoparia thielei sp. nov., p. 316, pl. 58, figs. 2, 3, 5, 7 and 10.

Cephalon large, broad in front; glabella large and tumid, elongate, and tapering somewhat towards the front, more than two-thirds the entire length of the cephalon; surface finely tuberculate; glabellar furrows 4 pairs; palpebral lobe sublunate; eye lobes very narrow; facial sutures strongly curved at the eye margin, turning sharply outward, and then gently inward, to the anterior margin of the head, which it meets a little nearer to the central line than the eye; from the posterior end of each eye the suture curved gently outward, then extending horizontally, and finally directed obliquely to meet the posterior margin at the genal spine.

Cephalic border finely wrinkled and tuberculate; free cheeks radiately wrinkled. Thoracic segments? Pygidium semicircular; axis 8 rings, extending to posterior border.

Length of head 15.5 mm.; width to base of spines 59 mm.?

Upper Cambrian *Agnostus* Zone.

The large cephalon, with its conico-cylindrical glabella and wrinkled border, shows the relationship of this species to *Ptychoparia*. The author compares the species with *Olenellus sp.* Etheridge, and *O? forresti* . This species Matthew referred to *Protolenus*, Trans. Roy. Soc. Canada, Vol. 11, 1893, p. 102.

Ptychoparia minima sp. nov., p. 318, pl. 58, figs. 1 and 6?; pl. 59, fig. 22, cranidium and pygidium.

Glabella subcylindrical, long, tapering slightly anteriorly, upper surface finely pustulate; glabellar furrows three pairs; occipital furrow deeply impressed; occipital ring showing traces of a slight ridge bearing three small, blunt spines directed posteriorly; front border of the glabella nearly semicircular, but somewhat truncated, broad and depressed; palpebral lobes large, elliptical; eyes narrow, sublunate and strongly curved.

Pygidium comparatively large; axis with about 6 segments; lateral lobes moderately wide, slightly rounded and depressed in relation to the axis; margin broader than in *P. thielei*, and with conspicuous striae parallel with the border.

Upper Cambrian *Agnostus* Zone.

Affinities: The deep and depressed border of the glabella and the spinous processes of the neck ring may be compared with *Atops trilineata* Emmons.

Crepicephalus etheridgei sp. nov., p. 319, pl. 58, figs. 4 and 8; pl. 59, figs. 20, 21.

Cranidia provisionally referred to this species somewhat like that of *Sphaeropthalmus alatus*, small, semicircular, inflated.

Glabella subspherical or elongately globose, highest along the medium longitudinal line; surface faintly marked with three pairs of furrows, which are curved forward and outward from either side of the middle line; frontal border depressed, sulcated, and with an almost straight or slightly curved margin.

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Occipital ring narrow; occipital furrow deeply impressed; fixed cheeks moderately broad, subtriangular, and deeply incised at the junction with the glabella; outer margin gently sloping outward posteriorly, and with a semilunar depression on the ocular margin; surface finely tuberculated.

Pygidium subquadrate; axis more than three-quarters of the length of the pygidium, with 5 rings; lateral lobe furrows at first gently sloping posteriorly, then curving sharply backward; margin with doublure and remnants of two long, diverging spines directed backward and outward.

The author compares *Crepicephalus onustus* Whitfield, with the head of his new species and the pygidium of *C. liliana* Walcott.

——— Ostracoda from the Upper Cambrian Limestone of South Australia.

On the Age of the Barnsdale Gravels, with a Note on the included Fossil Wood.—Proc. Roy. Society, Victoria, New Ser., Vol. 31, Part 1, 1918, pp. 108-174, pl. 9, 10.

The species of Ostracoda are represented by the genera *Leperditia* and *Isochilina.*

The author describes and illustrates the following species:

Leperditia tatei sp. nov.

The outline of this fossil reminded the author of the Cambrian genus *Aluta,* especially *A. enyo* Walc. The species has the general form of *Leperditia anna* Jones.

Leperditia capsella sp. nov.

The species has many points of resemblance to *L. canadensis* Jones.

Isochilina sweeti sp. nov.

From its contour one might at first be inclined to refer this species to *Aristozoe* Barrande, but that genus is more compressed and podshaped, with a nodular prominence in the anterior dorsal-region. Chapman compares *Isochilina ottawa* Jones, but this species is only half the diameter of the present Australian species and is more oblong in shape.

——— The Heathcote Fauna.—Records Geo. Sur. of Victoria, Vol. 4, Part 1, 1906, pp. 87-104, pl. 6, 7.

The following Trilobites are described:

Agnostus australiensis Chapman.

Dinesus ida Etheridge, Jr.

Saratogia cf. *hamulus* Owen; *S. rugulata* sp. nov.

Saukia cf. *Saukia* sp.

Notasaphus fergusoni gen. nov. et sp. nov.

The cephalon shows a large, tumid and expanded glabella, with about four transverse furrows. There is a well marked frontal border and the occipital ring carries a blunt spine.

Pygidium: The spines of the pygidial border vary in number from 4 to 6 on each side, corresponding to the number of pygidial segments.

The genus approaches *Dorypyge,* from which it differs in the form of the glabella, it being more expanded in front.

Notasaphus is further distinguished in the almost obsolete transverse furrows. The pygidium of *Blackwelderia* also resembles that of *Notasaphus,* but the cephalon of that genus has a glabella which is narrower and tapering in front.

Leperditia knowsleyensis Chapman.

CLARK, T. H. A New Trilobite Appendage.—Am. Jour. Sci., Vol. 4, 1922, pp. 245-248, fig. 1 in text.

The author describes the appendage of a Trilobite from the Shumardia limestone in the Lévis formation, consisting of a small fragment of the outer part of a coxopodite, a large exopodite, a fragmentary endopodite, and one

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CLARK, T. H.—Continued.

or two other members in which the exopodite is by far the largest and most prominent member. Its outline, blunt at the inner end, terminating in a long spine at the distal extremity, widest beyond the middle; the posterior margin carrying a score or so of setae which are short, stout and pointed outward.

Of the genera represented in the Shumardia zone only *Isotelus* and *Triarthrus* have so far yielded recognizable appendages. In the Lévis formation the most abundant Trilobite is *Shumardia granulosa* Billings. The other genera represented in the Shumardia limestone are *Agnostus, Endymionia, Symphysurus, Telephus* and *Holometopus,* to any one of which this appendage might belong.

CLARKE, JOHN M. New Palaeozoic Crustaceans.—N. Y. State Mus., 15th Rep. of the Director, 1919, p. 129, pl. 1.

Bunaia, a new Merostome Crustacean.

Bunaia woodwardi, gen. et sp. nov.

The chief difference of *Bunaia* from *Bunodesis* is in the structure of the abdomen. In *Bunodesis* there are six broad segments, followed behind by three narrow ones.

In *Bunaia* this structure appears to be somewhat different. The cephalon is followed behind by narrow segments, of which 7 or 8 can be counted, with possibly one missing. These seem to be of somewhat unequal length and to be longitudinally ridged, but without lateral flanges.

On the three specimens known, there is a broad, detached, smooth spine lying alongside the head, which may have been the telson.

——— Crustacea from the Permian of Sao Paulo, Brazil.—N. Y. State Mus., 15th Rep. of the Director, 1919, p. 135, pl. 2, 3.

Paulocaris pachecoi sp. nov.

Gampsonyx brasilicus sp. nov.

——— Fosseis Devonianos do Paraná.—Monog. do Servico Geol. e Min. do Brazil, Vol. 1, 1913.

The following Crustacea are described and illustrated:

Homalonotus noticus sp. nov.

This fine species is quite distinctive and is the only member of the genus represented in the continental South American Devonian that shows even the slightest tendency to a spinous test.

Homalonotus herschelii Murchison.

Homalonotus (Schyzopyge) paraná sp. nov.

The species is only represented by a pygidium, which bears along the margin a series of broad, flat, but short lappets, which are continuations of the ribs. Ribs, three pairs, duplicated.

Dalmanites accola sp. nov.; *D. falklandicus* sp. nov.; *D. sp.*

Under the preoccupied term *Cryphaeus* Green, 1837, (not *Cryphaeus* Agassiz, 1832,) the author describes three new species:

Asteropyge (Cryphaeus) australis sp. nov.; *Asteropyge* Corda., 1847; *Cryphaeus* (?) *allardyceae* sp. nov.

Group *Mesembria*:

The characteristics of this section are the small, highly elevated and forward eyes, minute cheek spines which, like the genal angles, are curved upward.

Dalmanites acacia (Schwarz).

Calmonia gen. nov., genotype *C. signifer* sp. nov.

Body ovate. Cephalon short, subtriangular, bounded by a convex marginal rim; in front a short spine protruding; genal angles with spinules at the turn of the lateral margin toward the base; glabella depressed; lateral furrows 3 pairs, the first and second pairs appearing slightly fused at their

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outer ends; a central circular pit faintly visible in the frontal lobe; occipital furrow deep; eyes small, schizochroal, elevated and well forward.

Facial suture with anterior branch cutting the lateral portion of the frontal lobe, its posterior branch traversing the cheek horizontally and, because of the anterior position of the eyes, located well above the occipital furrow, so that the free cheeks are small and the fixed cheeks proportionally larger.

Thorax with 11 segments; pleurae grooved, anterior ends beveled and well rounded, posterior becoming sharp or sublanceolate towards the pygidium.

Pygidium small, elongate, subtriangular; axis with 8 or 9 rings; pleurae 4 pairs, with trace of a fifth, each being divided by a low sulcus; margin not thickened, but bearing a fringe of 6 spinules on each side; a stout terminal spine, having a length equal to that of the pygidium.

Calmonia signifer micrischia var. nov.; *C. subseciva* sp. nov.; *C. ocellus* (Lake); *C. ?gonzagana* Clarke.

Pennaia gen. nov., genotype *P. pauliana* sp. nov.

A distinct variation of the Mesembria type of *Dalmanites,* more Phacopidean than *Calmonia* in respect to the cephalon, in which the parts are more compact and condensed. In the thorax the axis is relatively much broader than the side lobes, while the pleural ends of the anterior segments are rounded rather than lanceolate.

The pygidium is Phacopidean in its small size and sparse segmentation.

Proboloides gen. nov., genotype *P. cuspidatus* sp. nov.

In the possession of a frontal snout on the cephalon, this species is a Probolium after the type of northern snouted Dalmanitids; but in respect to the character of the snout, the form of the cephalon, its style of lobation and smoothness of surface, it departs from that type. The reversional character of this genus is expressed by the singular and unparalleled reappearance of spines on the lateral margin of the cephalon at the outlet of the facial sutures, and, as these lie above the normal position of the spines at the genal angles, each cheek thus bears a pair of spines.

Proboloides pessulus sp. nov.; *Proetus sp.*

A Bibliography is given on page 32 for the years 1842 to 1909.

COBBOLD, E. S. The Trilobite Fauna of the Comley Breccia-bed (Shropshire).—Abs. Proc. Geol. Soc., 1912-13, p. 12. Quart. Jour. Geol. Soc., Vol. 69, 1913, pp. 27-44, pl. 2, 3.

Paradoxides intermedius sp. nov., p. 29, pl. 2, figs. 1 a-c, 3 and figs. 2, 4, and 11 c.

The species simulates three forms, *P. hicksii,* its variety *palpebrosus* Linrs., and *P. sjögreni,* in the weakness of the glabellar furrows along the axial line. but differs in the course of the facial suture, and consequently in the general form of the cranidium, and also in the outline of the glabella.

Agraulos sp. cf. *A. quadrangularis* Whitfield, p. 31, pl. 2, figs. 15 a-c.

Subgenus *Strenuella* sp. indeter., p. 32, pl. 2, figs. 12a to 14c.

Conocoryphe aequalis Linrs., p. 32, pl. 3, figs. 18 a-c.

Conocoryphe (*Liocephalus*) *impressa* Linrs., p. 33, pl. 3, figs. 16 a-c.

Dorypyge reticulata sp. nov., p. 33, pl. 3, figs. 1a-15.

The species differs from *D. lakei,* (1) in having a rather longer eye lobe; (2) in being proportionately wider across the posterior angles of the cranidium; (3) in the surface characters; (4) in the proportionate length of the spines; (5) in the presence of pleural facets, no trace of which have been detected in *D. lakei;* (6) in the more tapering axis of the pygidium; (7) in the absence of spines on the axis; and, (8) in the diminution backward in the length of the marginal spines.

Microdiscus punctatus (Salter).

Ptychoparia (*Liostracus*) *lata* sp. nov., p. 38, pl. 2, figs. 16a-17c.

This form has many points in common with *P.* (*Liostracus*) *pulchella.* It differs however in the greater width of the glabella, the concurrent narrow-

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COBBOLD, E. S.—Continued.

ness of the fixed cheeks, the absence of the ocular ridge, and in the shorter and more erect occipital spine. The eyes larger and situated more forward.

Lorenz, 1906, Zeitschr. der Deutsch. Geol. Ges., described *Liostracus latus* sp. nov., so this species becomes a synonym.

Ptychoparia (*Liostracus*) ?*dubia*, p. 39, pl. 3, figs. 19a, 19b.

——— The Cambrian Horizon of Comley (Shropshire), and its Brachiopoda, Pteropoda, Gastropoda, &c.—Quart. Jour. Geol. Soc., Vol. 76, 1921, pp. 325-386, pl. 41-44.

Ostracoda:

Leperditia? *lentiformis*, sp. nov., Cambrian, Comley.

General form bean-shaped, anterior end shortly truncate, dorsal border gently convex for about two-thirds of the total length, then bending more rapidly and passing to the posterior rounded end in a line that is almost straight.

Ventral valve one long, fairly-regular curve from the truncate anterior to the posterior end.

Test thin, corneous, having the surface marked by a network of impressed lines.

Surface of both valves regularly convex, except near the anterior end, where there is a short, ill-defined depression passing obliquely towards the ventral border.

Chiefly differs from *L.* ?*dermatoides* Walcott in having a very thin membranous and punctate test, &c.

Escasona sp.?

Referred to this genus notwithstanding the fact that there is no sign of the ocular tubercle.

Bradoria? *sp.*

In shape like *Fordilla troyensis* Barr., as given by Walcott. It has however, a distinct marginal flat border, ventrally and at the two ends, but there is no trace of an ocular tubercle.

COLLIN, L. Le Niveau à *Phacops potieri* dans l' Ouest du Finistére.—Assoc. Franc. Av. Sci., 39, Toulouse, Part 2, 1911, pp. 44-51.

CRAMER, RUDOLF. Die Fauna von Golonog. Ein Beitrag zur Feststellung des Alters der Grauwacken Sandsteinschichten von Golonog und der entsprechenden Ablagerungen in Oberschlesien.—Jahrb. der Königl. Preuss. Geol. Landesanstalt für 1910, Bd. XXXI, Hheil 2, Heft 1, pp. 129-167, Plate 6.

Crustacea:

Griffithides mucronatus McCoy, p. 151, pl. 6, figs. 13-17.

CREPIN, A., see GOSSILET, J. A. A.

DECKE, W. Palaeont. Betrachungen VII.—Neues Jahrb. für Min., Vol. 5, 1915, pp. 112-126.

Generally on the range of fossil crustacea.

DELGADO, J. F. N. Fauna Silurica de Portugal. Descripcao de una Forma Nova de Trilobite.—Comm. des Travaux Géol. du Portugal, 1892, 31 pages, 6 plates.

Lichas (*Uralichas*) *ribeiroi*.

In a list of three horizons of the schist of de Vallonga, the author names the following crustacea:

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Zone A:

Dalmanites socialis Barr., and var. *proaeva* Barr.; *D. velillarti* Rouault.
Placoparia tourneminei Rouault.
Illaenus giganteus Burm. (*I. lusitanicus* Sh.)
Asaphus nobilis Barr.; *A. glabratus* Salter; *A. delessei* Duf.
Calymene tristani Brongn.; *C. salteri* Rouault.

Zone B:

Lichas incola Barr.
Placoparia tourneminei Rouault.
Dalmanites socialis and var. *proaeva* Barr.; *D. vetillarti* Rouault.
Illaenus giganteus Burm. (*I. lusitanicus* Sh.), form wide (*I. hispanicus* Vern. & Barr.)
Asaphus nobilis Barr. (*A. glabratus* Salt. ?); *A. guettardi* Brongn.; *A. contractus* Vern. & Barr.; *A. delessei cianus* Vern. & Barr.
Ogygia desmaresti Brongn.
Calymene tristani Brongn.; *C. salteri* Rouault.; *C. pulchra Barr.*, (*C. arago* Rouault.)

Zone C:

Lichas ribeiroi Delgado; *L. aff. incola* Barr., (or sp. nov.).
Acidaspis buchi Barr.
Cheirurus claviger Beyr.; *Ch.* (*Actinobeltis*) *octolobatus* McCoy.
Dalmanites torrubiae Vern. & Barr.; *D. vetillarti caudatus*, (*D. macrophthalmus* Brongn.)
Illaenus giganteus Burm., (*I. lusitanicus* Sh.); *I. wahlenbergianus* Barrande; *I. beaumonti* Rouault.
Asaphus nobilis Barr.; *A. glabratus* Salt.; *A. guettardi* Brongn.; *A. contractus* Vern & Barr.; *A. glabratus giganteus* (or sp. nov.).
Ogygia desiderata Barr., (*Illaenus powersi* Portl.?)
Calymene tristani Brogn.; *C. salteri* Rou.; *C. pulchra* Barr.
Dionide formosa Barr.
Plumulites aff. regius Barr.

DOHRN, A. Limulus und die Trilobiten.—Jenaische Zeitschr. für Mediz. u. Naturwiss., VI, 1871, p. 622.

DOLLO, L. La paléontologie ethnologique.—Bull. Soc. Géol. Belgique. Vol. 23, 1909, pp. 377-421, pls. 7-11, figs. 1-13.

DREVERMANN, FRITZ. Die Fauna der Siegner Schichten von Seifen unweit Dierdorf (Westerwald).—Palaeontographica, Vol. 50, 1904.

DUNBAR, CARL O. Stratigraphy and Correlation of the Devonian of Western Tennessee.—Am. Jour. Sci., Vol. 46, 1918, pp. 732-756.

Not descriptive. The author notes the following Trilobites.
Lower Devonian or Helderbergian Group:
Dalmanites pleuroptyx; D. retusus sp. nov.
Phacops logani; P. hudsoni.
Homalonotus sp.
Middle Devonian:
Phacops cristata.
Dalmanites myrmecophorus.

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DUNBAR, CARL O.—Continued.

——— New Species of Devonian Fossils from Western Tennessee.—Trans. Connecticut Acad. Arts and Sci., Vol. 23, 1920, pp. 148-149.

Dalmanites purduei sp. nov., p. 148, pl. 5, figs. 1-3.

The fusion of the glabellar lobes indicates that this species belongs to the group of *Dalmanites anchiops*.

Dalmanites retusus sp. nov., p. 149, pl. 5, fig. 3.

A pygidium from Perryville. The absence of a spinous extension of this rounded pygidium is sufficient to distinguish it from all other species of *Dalmanites* except *D. aspinosus* of Decker Ferry, New Jersey.

ETHERIDGE, R. The Cambrian Trilobites of Australia and Tasmania.—Trans. and Proc. Roy. Soc. South Australia, Vol. 43, 1919, pp. 373-393 and plate.

ETHERIDGE, R. and MITCHELL, JOHN. The Silurian Trilobites of New South Wales with References to Those of Other Parts of Australia. Part VI. The Calymenidae, Cheiruridae, Harpeidae, Bronteidae, &c., with Appendix.—Proc. Linnean Soc. N. S. Wales, Vol. 42, part 3, 1917, September 26, 1917, pp. 480-510, plates 24-27.

Describes and illustrates the following species:

Calymene australis sp. nov.

The chief difference between this species and *C. angustior* is the presence in the former of a fourth lateral glabellar furrow, but if future inspections of better preserved specimens of *C. angustior* show four lateral furrows, the species will probably fail.

Calymene australis may be regarded as typical, and the most characteristic trilobite of the Bowning series.

Calymene duni sp. nov.

Cheirurus (*Crotalocephalus*) *silverdalensis* sp. nov.

It is remarkable that this Bowning fossil, as is also the case with other trilobites of the same area, should possess striking features of structure common to two or more Bohemian species such as *Cheirurus quenstedti* and *C. gibbus*.

Ch. (*Crotalocephalus*) *sculptus* sp. nov.; *Ch.* (*Crotalocephalus*) sp.

Sphaerexochus mirus Beyr.

Staurocephalus murchisoni Barr.; *S.* (?) *clarkii DeKoninck; Harpes trinucleoides* sp. nov.

Ceratocephala (*Bounyongia*) subgen. nov. Genotype *B. bowningensis* sp. nov.

The new subgenus differs from others in having a pair of cephalic spines originating on the glabella in front of the occipital ring, and it is this feature on which Etheridge and Mitchell found the subgenus.

Bronteus mesembrinus sp. nov.; *B. bowningensis* sp. nov.; *B. molongenis* sp. nov.; *B. angusticaudatus* sp. nov.

Acanthopyge australis McCoy.

Corydocephalus palmata sinuata Ratte.

Trinucleus clarkei Macleary. (Clarke, Quart. Jour. Geol. Soc., Vol. 4, 1848, pp. 64-66.)

This species from the Silurian of Yarralumla is probably a species of *Harpes* mistaken for a *Trinucleus* by Clarke and Macleary.

Notes on other species of Australian Trilobites slightly known.

Asaphus Clarke, Quart. Jour. Geol. Soc., Vol. 4, 1848, p. 64.

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Beyond Clarke's casual remark, nothing is known of the presence of this genus in the Silurian rocks of Australia, but from the Despatch Limestone of Zeehan, Tasmania, a single small pygidium was obtained.

Amphion Etheridge, Tasmania Rep., Sec. Mines for 1895-6.

Under the name of *A.*(?) *brevispinus* the author described two small pygidia from the Despatch Limestone at Zeehan believed to be allied to the British *A. pseudoarticulatus* Port. Genus unknown in Australia.

Illaenus DeKoninck, Pal. Nouv. Galles du Sud. pt. 1, 1876, p. 46.

The history of this genus is comprised within that of two species, one Australian, the other both Australian and Tasmanian. The former is a pygidium recorded by DeKoninck from Boree Cavern, provisionally referred to *I. wahlenbergi* Barr. The second species, *I. johnstoni,* was established in the first instance for a cephalon occurring in Despatch Limestone at Zeehan, (Etheridge, Rep. Sec. Mines for 1895-6, p. XIV. pl. fig. 3) and the name was adopted for another cephalon from near Orange, (Etheridge, Rec. Geol. Sur. N. S. Wales, 8, pt. 4, p. 319, figs. 1, 2).

Homalonotus delphinocephalus Harrison, Trans. Roy. Soc. Victoria, Vol. 7, 1866, p. 17.

Found at Moonee Ponds, near Melbourne.

This was subsequently described by McCoy as *H. harrisoni,* (Geol. Sur. Vict., Decade 3, 1876, p. 19, pl. 23, fig. 11) from a different locality, Royal Park, Flemington.

Jenkins (Proc. Linnean Soc. N. S. Wales, Vol. 3, pt. 1, 1878, p. 26, 30.) mentioned *Homalonotus* as one of the Trilobites occurring in the Hume beds of the Yass River, but which is not of the characteristic type. Probably not a trilobite but a Pteropod.

Onycopyge liversidgei Woodward, (Geol. Mag., Dec. 2, Vol. 7, p. 97,) from Bombala District, N. S. Wales.

Notasaphus fergusoni Gregory, (Proc. Roy. Soc. Vict., pt. 2, 1903, p. 155.) This is unknown to the authors as a N. S. Wales species.

Cyphaspis lilydalensis Chapman, (Proc. Roy. Soc. Vict., Vol. 28, 1915, p. 163, pl. 19, fig. 6, and pl. 16, fig. 19.)

Wilson's Quarry, near Lilydale, Victoria; not known in N. S. Wales.

Proetus (*Forbesia*) *eurycops* McCoy, (Prod. Pal. Vict., Dec. 3, 1876, p. 17, pl. 22, figs. 10, 10a.) Not known in N. S. Wales.

FINCH, G. E. Notes on the Position of the Individuals in a Group of *Nileus vigilans* Found at Elgin, Iowa.—Proc. Iowa Acad. Sci., Vol. XI, 1903, pp. 179-181, pl. 14.

Finch makes the suggestion that the species referred to *Nileus* (*Vogdesia*) *vigilans,* a trilobite of the Maquoketa bed of Iowa, was in the habit of burying itself posterior end first. In a slab containing 15 entire specimens, all of which had the cephalon extended horizontally near the surface of the stratum, and the thorax and pygidium projecting downward, the rock showed no evidence that they were in burrows, and the fact that all were in the same position indicates that the attitude was voluntarily assumed.

They appear to have entrenched themselves by the use of the pygidia, which are incurved plates readily adapted for such use, and, buried up to the eyes, to have awaited the coming of prey; but they were, apparently, smothered by a sudden influx of mud.

The form of the eye in *Vogdesia vigilans* bears out this supposition, as noted by Raymond in his paper on the Appendages, Anatomy and Relations of Trilobites, 1920, p. 102.

FIREBRIG, K. Cassides und Cryptocephaliden.—Zool. Jahrb., Suppl. 12, 1910, pp. 161-264, plates 4-8.

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FLIEGEL, G. Ueber Obercarbonische Faunen aus Ost- und Südasien.—Palaeontographica, Vol. 48, 1901, pp. 91-136, figs. in text, plates 6-8.

Griffithides sumatrensis F. Roemer, p. 121, pl. 8, figs. 17, 18.

Das charakteristichste Merkmal unserer Art liegt in dem ungewöhnlich verlängerten Pygidium. Sie gehört dadurch in einer Formenkreis mit der *Griffithides elegans* Gemm. würde also zum Subgenus *Pseudophillipsia* Gemmellaro zu zählen sein, falls man in diesen Formen mehr als eine blosse Gruppe erblicken will.

FOERSTE, A. F. Silurian and Devonian Limestones of Western Tennessee.—Jour. of Geology, Vol. XI, 1903, pp. 554-583, pp. 678-715.

Palaeozoic Crustacea.

Wells (Upper Stone River) Fossils, (Ordovician):

Illaenus, resembling *I. americanus.*

Clinton Fossils, (Silurian):

Illaenus daytonensis; Illaenus, resembling *madisonensis.*

Calymene vogdesi.

Lichas breviceps clintonensis.

Brownsport Fossils, (Silurian):

Acidaspis sp.

Calymene niagarensis.

Ceraurus niagarensis.

Encrinurus sp.

Illaenus sp.

Phacops sp.

Sphaerexochus romingeri.

Linden (Helderbergian) Fossils, (Devonian):

Dalmanites pleuroptyx.

Phacops logani.

————Lorraine Fauna of New York and Quebec.—Bull. Sci. Laboratories, Denison Univ., Vol. 17, 1914, pp. 247-328, pls. 3-5.

Cryptolithus tessellatus Green, p. 317.

Calymene conradi Emmons, p. 320.

The fact is that Emmons in his description was trying to distinguish the Lorraine form from the published description of *Calymene senaria* given by Hall.

Emmons in his American Geology, 1856, p. 236, gives the following description:

Small, wide across the cheeks, cheek angles obtuse and rounded, posterior lobes of the glabella comparatively large and globular, thorax lobes very convex, with a row of tubercles in the furrows or between the axis and the lateral lobes.

The species described by Slocum, (New Trilobites from Maquoketa Beds of Fayette Co., Iowa, Field Mus. Nat. Hist., 1913, Pub. 171, p. 69, pl. 18, fig. 9) as *Calymene gracilis* sp. nov., is probably the same and agrees in general with Emmons' descriptions.

Proetus chambliensis sp. nov., p. 320, pl. 4, figs. 1 A-H.

Compared with *Proetus parviusculus* Hall, which has a rotund oval glabella, without visible lobation, the cephalon broad and flat, &c., the new species differs in a relatively longer, more oblong oval glabella, large basal lobes and indications of the middle lateral pair of furrows, with other differences.

————The Generic Relations of the American Ordovician Lichadidae.—Am. Jour. Sci., Vol. XLIX, 1920, pp. 26-50, plates 1-3.

1. Two prevalent types of glabella among European Ordovician Lichads.

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2. American species doubtfully referred to the European genera *Platylichas* and *Hoplolichas*.

3. American species definitely referred to the European genus *Hemiarges*.

4. *Acrolichas* proposed for twelve American and one Irish species in which the author includes:

Lichas minganensis Bill.; *L. cucullus* M. & W.; *L. trentonensis* Conr.; *L. cornutus* Clarke; *L. harrisi* Miller; *L. hibernicus* Portl.; and doubttfully *L. jukesii* Bill.; *L. robinsi* Ulrich; *L. bicornis* Ulrich; *L. clermontensis* Slocum; and *Amphilichas rhinoceros* Slocum.

5. The area of origin of *Acrolichas*.

6. American species of *Acrolichas* formerly were referred to the European genus *Amphilichas*.

7. The pygidia of *Acrolichas* compared with those of *Metalichas*.

8. The pygidia of *Acrolichas* compared wiht those of *Platopolichas*.

9. The East Baltic genera *Hoplolichas* and *Conolichas*.

10. The East Baltic genera *Homolichas, Leiolichas* and *Metopolichas*.

11. The Bohemian Silurian genera *Corydocephalus* and *Dieranopeltis*.

12. The distribution of American species of *Acrolichas*.

13. The origin of the generic types among the cranidia of the Lichadidae.

14. The free cheeks, hypostoma and thorax of *Acrolichas*.

15. Notes on American species of *Acrolichas*.

16. Possible occurrence of *Acrolichas* in Baltic Area of Europe.

17. Bibliography.

——— Notes on *Isotelus, Acrolichas, Calymene* and *Encrinurus*.—Bull. Denison Univ., Vol. 19, 1921, pp. 65-81, 6 plates.

Isotelus brachycephalus sp. nov., p. 65, pl. 14A and 15.

The author suggests that the presence of both broad and narrow forms of *Isotelus* in the Richmond strata of Ohio and Indiana indicates the possibility that the more elongate forms (*Isotelus maximus*) may be the males, and the broader forms (*Isotelus brachycephalus*) the females of the same species.

Acrolichas(?) *shidleri* sp. nov., p. 72, pl. 17, fig. 3 a-b.

For the American species at present referred to the European genus *Amphilichas*, the author proposed the name of *Acrolichas* on account of the differences in the structure of the pygidia.

The pygidia have three pairs of ribs, all with free tips, but only the first two pairs of ribs bear median grooves; the axial lobe narrows posteriorly to an acute point which reaches the notch between the free tips of the posterior pairs of ribs.

Genotype *Lichas cucullus* Meek & Worthen.

Calymene abbreviata Foerste, p. 74, pl. 18, fig. 5 a, b.

Calymene sp. (Lorraine form), p. 75, fig. 1, pl. 18.

Calymene retrorsa minuens var. nov., p. 76, pl. 18, fig. 4.

Characteristic fossils of the Waynesville member of the Richmond formation.

Calymene sp. (West Union form), p. 77, pl. 18, fig. 8 a, b.

This form is about three-fifths as large as typical *Calymene vogdesi*. It has about the same form of the cranidium, but the anterior half of the glabella is more quadrangular and is truncately rounded anteriorly; the anterior margin of the cranidium is relatively broad, but there is no broad groove separating this border from the anterior margin of the glabella as in *C. vogdesi*.

Calymene niagarensis Hall; *C. breviceps* Raymond.

Calymene cedarvillensis sp. nov.

This large form from the Cedarville dolomite differs from *Calymene vogdesi* in having the narrow anterior border not separated from the anterior part of the glabella by a groove distinct from the general curvature of the border. Compared with *C. celebra*, its anterior border is considerably wider.

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FOERSTE, A. F.—Continued.

Encrinurus ornatus Hall and Whitfield.

Encrinurus hillsboroensis sp. nov.

West Union formation at Hillsboro, Ohio.

A fragment which differs from either *Encrinurus ornatus* or *E. reflexus* in the strong posterior reflexion of the distal parts of the ribs on the pygidium. There are eight pairs of ribs and the pygidium terminates posteriorly in an acute spinose end.

——— The Kimmswick and Plattin Limestone of Northeastern Missouri.—Jour. Sci. Lab. Denison Univ., Vol. 19, 1920, pp. 175-224, plates 21-23.

Fossil Crustacea:

Amphilichas cucullus Meek & Worthen, p. 214.

Bumastus holei sp. nov., p. 214, pl. 21, figs. 15 a, b; pl. 22, figs. 15 a-n.

Casts of the head and tail. The lower side of the cranidium is characterized by shallow impressed lunettes, relatively very distant from each other, but close to the posterior margin.

Probably identtical with *Bumastus orbicaudatus* Clarke.

Bumastus rowleyi sp. nov., p. 214, pl. 21, figs. 16 a, b; pl. 22, figs. 16 a, b.

The general aspect of the cranidium resembles that of *B. ambiguus* Foerste. The cast of the lower side of the cranidium shows impressed lunettes along the dorsal groove which are separated by a distance of nearly 10 mm.

Endymionia bellatula Savage, p. 218.

Nileus sp., p. 218, pl. 23, figs. 4 a, b.

Raymond in his paper on some new Ordovician Trilobites, 1890, p. 292, referred this species to *Vogdesia*, a genus closely related to *Homotelus* and *Brachyaspis*, but which differs from both these genera in having a wider axial lobe in the thorax, and little or no trace of dorsal furrows on the pygidium.

The genotype of *Vogdesia* is *V. bearsi* Raymond from the Chazy; other species occur in the Trenton group of Illinois and Minnesota. It is also a common Trilobite in the Maquoketa of Iowa.

Proetus undulostriatus Hall, p. 219.

Pterygometopus cf. lincolnensis Branson.

Remopleurides missouriensis sp. nov., p. 220, pl. 21, fig. 17; pl. 22, figs. 17 a, b.

A cranidium which the author compares with three American species, *Remopleurides striatulus* Walc., *R. lingulatus* Ruedemann and *R. tumidus* Rued.

From the first species the Ralls County specimens have much more distinct indications of the glabellar furrows, the frontal lobe curves downward more strongly and for a greater distance, and the glabella is somewhat narrower and less flattened.

Bathyurus spiniger Hall, p. 222, pl. 22, fig. 20, (cranidium).

Ceraurinus cf. *trentonensis* Barton, p. 216.

Ceraurus cf. *bispinosus* Raymond & Barton, p. 216, pl. 21, fig. 18 a, c.

Ceraurus plattenensis sp. nov., pl. 217, pl. 21, figs. 18 a, b; pl. 23, figs. 3 a, b.

FOX, H. Geological Notes, No. 2; Supplementary Notes on the Distribution of Fossils and Rocks on the North Coast of Cornwall.—Trans. Roy. Soc. Cornwall, Vol. 12, 1904, pp. 753-759.

FRECH, H. F. Das Marine Karbon in Ungarn. Közl, 36, 1906, pp. 1-50, 50-153, figs., plates 1-6.

Trilobita:

Griffithides dolsinensis Illés, p. 29, pl. 1, fig. 1 a, b; *G. minor* Woodw., p. 28, pl. 1, fig. 2, 3; *G. mucronatus* F. Roemer, p. 29, pl. 29, fig. 5 a, b.

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FUCHS, ALEXANDER. See SPRIESTERSBUCH, JULIUS.

GARDINER, G. I. See REED, F. R. COWPER.

GARDINER, G. I. and REYNOLDS, S. H. On the Igneous and Associated Sedimentary Rocks of the Glensaul District, with Palaeontological Notes by F. R. C. Reed.—Quart. Jour. Geol. Soc., London, Vol. 46, 1910, p. 253, plates XX-XXII; Palaeontological Notes, pp. 271-278, plates XXI-XXII.

Trilobita:

Illaenus weaveri Reed, p. 272.

Niobe sp., p. 272, pl. 22, fig. 3 a, b.

Nileus armadillo Dalm., p. 273, pl. 22, fig. 2 a, b.

Bathyurellus glensaulensis sp. nov., p. 274, pl. 21, fig. 1 a. b.

Bathyurus cf. *timon* Bill., p. 275, pl. 21, fig. 5b; *B. aff. nero* Bill., p. 275, pl. 21, fig. 4 a, b.

Pliomera pseudoarticulata Portl., p. 276, pl. 22, fig. 5, 6.

Encrinurus octocostatus sp. nov., p. 277, pl. 22, fig. 4 a, b.

Phacops (Chasmops) aff. odini Eichwald, p. 277.

GIRTY, GEORGE H. Preliminary Report on the Palaeozoic Invertebrate Fossils from the Region of the M'Alester Coal Field, Indian Territory.—Ann. Rep. U. S. Geol. Sur., 1897-98, pp. 539-593, pl. 60-62.

Phacops logani Hall, p. 571; *P. hudsonicus* Hall, p. 571, pl. 61. fig. 4 a-d.

Proetus protuberans Hall, p. 573.

Dalmanites pleuroptyx Green.

The author figures a large specimen of *Phacops hudsonicus*, which appears to be abundant in Tennessee and Oklahoma. The species is extremely close to *P. logani*, with which it is associated, and the only character which can be relied upon to distinguish them is the comparative size and number of facets in the eyes. The eyes of *P. hudsonicus* are smaller and have fewer lenses than those of *P. logani*.

Dr. Hall describes this species as follows: Eyes small, extending backward to the line of the first annular furrow, having an elevation of four ranges of lenses.

Dr. Troost described a similar species in 1834, Mém. Soc. Géol. France, Vol. 3, p. 94, pl. XI, fig. 1-5, from Tennessee, fig. 5 of Troost's Illustrations.

——— Fauna of the Boone Limestone at St. Joe, Arkansas. Bull. U. S. Geol. Sur., 598, 1915.

Brachymetopus? elegans sp. nov., pl. 2, fig. 6, 6a, Pygidium.

Axis of the pygidium with fourteen joints, lateral lobes with nine pairs of ungrooved ribs; a row of pointed nodes along the middle of the axis and a row a little less than half way down the sides.

The specimen is unique.

GORTANI, M. La Serie Devoniana nella Giogaia del Cogliane.—Bull. R. Con. Geol. Ital., Vol. 43, 1913, pp. 235-280, figs. in text, pl. 1-3.

GOSSELET, J. A. A., BARROIS, C., LERICHE, M. and CREPIN, A. Description de la Faune Siluro-Dévonienne de Liévin. Trilobites by J. A. A. Gosselet. Cephalopoda by A. Crépin. Lamellibranchia, Gastropoda, Conularida, Ostracoda and Merostomata by M. Leriche.—Mém. Coc. Géol. Nord., Vol. 6, No. 2, pt. 1, pp. 1-64, pl. 1-9, 1912.

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GREGORY, J. W. *Cyphaspis spryi,* a New Species of Trilobite from the Silurian of Melbourne.—Proc. Roy. Soc. Victoria, New Series, 1901, pp. 179-182, plate XXII.

GURICH, GEORG. Leitfossilien: ein Hilfsbuch zum Bestimmen von Versteinerungen bei geologischen Arbeiten in der Sammlung und im Feld, Erste Lieferung Kambrium und Silur, Berlin, 1908.

Ordnung Trilobita, pp. 14-24, pl. 3-5, Kambrium.

Reich 1. Oligomeria.

Rumpfsegmente in geringer Anzahl, 2-3 oder 6.

a. Unterordnung Isopyge.

Schwanzschild dem Kopfschild ahnlich.

Fam. Microdiscidae.

Microdiscus speciosus Ford, p. 16, pl. 3, fig. 1.

Fam. Agnostidae.

Agnostus granulatus Barr., p. 16, pl. 3, fig. 3; *A. pisiformis* Linné, p. 16, pl. 3, fig. 2; *A. reticulatus* Ang., p. 16, pl. 3, fig. 4.

b. Unterordnung Heteropygia.

Das Schwanzschild weicht in form, zumeist auch inbezug auf die grösse vom Kopfschild erheblich ab; Anzahl der Rumpfsegmente nicht mehr als sechs.

Reich 2. Pleiomeria.

Rumpfsegmente in grösserer Anzahl; acht oder mehr.

c. Unterordnung Micropygia.

Rumpfsegmente sehr zahlreich, Pygidium erheblich schmäler als der Kopf, und die Anzahl der erkennbarren Segmente des Schwanzschildes zumeist geringer als die halbe Anzahl der Rumpfsegmente.

Fam. Olenellidae.

Olenellus thompsoni Hall, p. 17, pl. 4, fig. 2.

Olenellus (*Mesonacis*) *mickwitzii* Fr. Schm., p. 17, pl. 3, fig. 5.

Olenellus (*Holmia*) *kjerulfi* Linnars., p. 17, pl. 4, fig. 1.

Fam. Paradoxididae.

Paradoxides harknessi Hicks, p. 18; *P. pusillus* Hicks, p. 18, pl. 3, fig. 8; *P. oelandicus* Sjögr., p. 18, pl. 3, fig. 6; *P. hicksii* Salter, p. 18; *P. davidis* Salter, p. 18; *P. forchammeri* Ang., p. 19, pl. 3, fig. 7.

Fam. Ellipsocephalidae.

Ellipsocephalus hoffi Schloth., p. 19, pl. 5, fig. 1.

Arionellus ceticephalus Barr., p. 19, pl. 5, fig. 2.

Conocephalus sulzeri Barr., p. 19, pl. 5, fig. 3.

Fam. Olenidae.

Ptychoparia striata Barr., p. 20, pl. 5, fig. 4.

Liostracus aculeatus Ang., p. 20, pl. 5, fig. 6.

Olenus truncatus Brünn., p. 21, pl. 5, fig. 7.

Parabolina spinulosa Wahlenb., p. 21, pl. 5, fig. 8.

Eurycare latum Böck, p. 21, pl. 5, fig. 9.

Peltura scarabaeoides Wahlenb., p. 21, pl. 5, fig. 10.

Sao hirsuta Barr., p. 21, pl. 5, fig. 5.

Unterordmug Macropygia.

Pygidium gross, Rumpfsegmente meist weniger zahlreich als die doppelte Anzahl der Segmente des Pygidiums.

Fam. Dicellocephalidae.

Dicellocephalus minnesotensis Owen, p. 22, pl. 3, fig. 9.

Leitfossilien des Silurs.

Klasse Crustacca, Ordnung Trilobita, pp. 62-95, pls. 22-28.

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1. Reihe Oligomeria.

Rumpfsegmente in geringer Anzahl.

1. Unterordnung Isopygia.

Pygidium dem Kopfschild an grösse gleich und von sehr ähnlicher Form.

Fam. Agnostidae Dalm.

Rumpf nur mit 2 oder 3 Segmente, Augen und Gesichtsnaht fehlen.

Agnostus tardus Barr., p. 62, pl. 22, fig. 1.

2. Unterordnung Heteropygia.

Das Pygidium weicht in form und grösse vom Kopfschild ab, Anzahl der Rumpfsegmente—. Die hierher gehörigen Formen haben entweder gar keine oder sehr grösse Augen. Gesichtsnaht nahe am Seitenrande.

Fam. Trinucleidae.

Trinucleus ornatus Sternberg, p. 62, pl. 22, fig. 2; *T. bucklandi* Barr., p. 63, pl. 22, fig. 3.

Unterfamilie Dionideae.

Dionide formosa Barr., p. 63, pl. 22, fig. 4.

Unterfamilie Ampyceae.

Ampyx tetragonus Ang., p. 63, pl. 22, fig. 5.

Fam. Aeglinidae. (The author placed the Aeglinidae with the Trinucleidae.)

Aeglina ornata Barr., p. 63; *A. prisca* Barr., p. 63, pl. 22, fig. 6.

2. Reihe Pleiomeria.

Rumpfsegmente mindestens 8.

3. Unterordnung Micropygia.

Fam. Paradoxididae.

Remopleurides radians Barr., p. 64, pl. 23, fig. 1.

Fam. Cyphaspidae.

Cyphaspis burmeisteri Barr., p. 64, pl. 22, fig. 7.

Fam. Olenidae.

Arethusina konincki Barr., p. 64, pl. 22, fig. 8.

Fam. Ellipsocephalidae.

Triarthrus becki Green, p. 64, pl. 28, fig. 3.

Fam. Harpedidae.

Harpes ungula Sternberg, p. 65, pl. 23, fig. 9.

4. Unterordnung Macropygia.

Pygidium gross, breiter als die halbe Breite des Kopfschildes, Rumpfsegment meist weniger zahlreich als die doppelte Anzahl der Ringe des Pygidiums.

1. Gruppe Opisthoparia.

Fam. Dicellocephalidae.

Ceratopyge forficula Sars, p. 65, pl. 25, fig. 1.

Fam. Asaphidae.

1. Unterfamilie Asaphinae.

Ogygia buchi Brong., p. 66. pl. 23, fig. 2.

Asaphus expansus Dalm., p. 66, pl. 24, fig. 1.

Megalaspis limbata Boeck, p. 67, pl. 23, fig. 3.

Basilicus tyrannus Murch., p. 67, pl. 23, fig. 4.

Isotelus gigas De Kay, p. 67, pl. 24, fig. 2.

2. Unterfamilie Nileinae.

Nileus armadillo Dalm., p. 67, pl. 24, fig. 3.

3. Unterfamilie Illaeninae.

Illaenus esmarcki Holm., p. 68, pl. 24, fig. 4.

Bumastus barriensis Murch., p. 68, pl. 24, fig. 5.

Fam. Bronteidae.

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GURICH, GEORG.—Continued

Fam. Lichidae.

Gattung *Lichas*, p. 69; *Urolichas ribeiroi* Delgado, p. 69.

1. Reihe Lichinae.

Untergattung *Platopolichas avus* Barr., p. 69, pl. 25, fig. 2.

Hoplolichas conicotuberculatus Nieszk., p. 69, pl. 25, fig. 3.

Trachylichas scaber Beyr., p. 69, pl. 25, fig. 4.

2. Reihe Argetinae.

Untergattung *Plusiarges palmatus* Barr, p 69, pl. 25, fig. 5.

Fam. Acidaspidae.

Fam. Proetidae, p. 70.

2. Gruppe Gonatoparia.

Homalonotus brongniarti Salter, p. 70; *H. bisulcatus* Salter, p. 70, pl. 26, fig. 1.

Untergattung *Trimerus delphinocephalus* Green, p. 70, pl. 26, fig. 2.

Fam. Calymenidae.

Calymene blumenbachii Bronn., p. 71, pl. 26, fig. 4; *C. senaria* Conrad, p. 71, pl. 26, fig. 5.

3. Gruppe Proparia.

Der hintere Abschnitt der Gesichtsnaht mündet vor den Hinterecken.

Fam. Phacopidae.

Phacops s. str.

Dalmania socialis Barr., p. 71. pl. 26, fig. 6; *D. caudata* Emm., p. 71, pl. 26, fig. 7.

Acaste downingiae Murch., p. 72, pl. 27, fig. 1.

Chasmops odini Eichw., p. 72, pl. 26, fig. 8.

Fam. Cheiruridae.

Cheirurus exsuls, p. 72, pl. 27, fig. 2; *C. insignis* Beyrich, p. 73, pl. 27, fig. 3.

Sphaerexochus mirus Beyr., p. 73, pl. 27, fig. 4.

Fam. Encrinuridae.

Cybele bellatula Dalm., p. 73, pl. 27, fig. 5.

Encrinurus punctatus Wahlenb., p. 73, pl. 27, fig. 6.

Ordnung Ostracoda.

Leperditia baltica Fr. Schm., p. 74, pl. 27, fig. 7.

Fam. Primitidae.

Beyrichia tuberculata Boll., p. 74, pl. 27, fig. 8.

Fam. Phyllocaridae.

Ceratiocaris stygia Salter, p. 74, pl. 28, fig. 4.

——— Leitfossilien, Zweite Lieferung, Devon, Berlin, 1909.

Ordnung Trilobita, pp. 150-168, plates 47-49.

1. Gruppe Opisthoparia.

Gesichtsnaht mündet am Hinterrande.

Fam. Bronteidae.

Untergattung *Thysanopeltis speciosa* Corda, p. 151, pl. 47, fig. 1.

Fam. Lichidae.

Untergattung *Euarges haueri* Barr., p. 151, pl. 47, fig. 2.

Liparges simplex Barr., p. 152; *Ceratarges armatus* Golf., p. 152.

Fam. Proetidae.

Proetus bohemicus Corda, p. 152, fig. in text, No. 41; *P. cuvieri*, p. 153, pl. 47, fig. 3; *P. eremita* Barr., p. 153, pl. 47, fig. 4; *P. crassirhachis* F. A. Roemer, p. 154.

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Dechenella burmeisteri Richter, p. 154, pl. 47, figs. 5, 6; *D. verneuili* (Barr.), p. 155, pl. 47, fig. 7.

2. Gruppe Gonatoparia.

Die Gesichtsnaht endet in den Hinterecken.

Fam. Calymenidae.

Fam. Homalonotidae.

Homalonotus (*Dipleura*) *dekayi* Green, p. 156, pl. 48, fig. 1.

Homalonotus (*Burmeisteria*) *armata* Bur., p. 156, pl. 48, fig. 2.

Homalonotus (*Digonus*) *gigas* F. A. Roemer, p. 157, pl. 48, fig. 8; fig in text No. 42.

3. Gruppe Proparia.

Gesichtsnaht mündet am Seitenrande vor den Hinterecken.

Fam. Phacopidae.

Unterfamilie Dalmaninae (Dalmanitinae Reed).

Untergattung *Odontochile hausmanni* Brong., p. 159, pl. 49, fig. 1, fig. in text No. 43; *O. rhenana* Kayser, p. 159.

Cryphaeus laciniatus Ferd. Roemer, p. 160, pl. 49, fig. 2; *C. punctatus Steininger*, p. 161, pl. 47, fig. 8, and pl. 49, fig. 3; *C. barrandi* Caillaud & Oehlerts, p. 161.

Unterfamilie Phacopinae.

Vordere seitliche Querfurchen auf der Glabella undeutlich

Trimerocephalus anophthalmus Frech, p. 162, pl. 49, fig. 4.

Phacops fecundus Barr., p. 163, pl. 49, fig. 5; *P. major* Barr., p. 163; *P. superstes* Barr., p. 163; *P. fecundus* & Var. *major* Barr., p. 166; *P. breviceps* Barr., p. 166; *P. latifrons* Bronn, p. 167, pl. 49, fig. 6; *P. schlotheimi* Bronn, p. 168, pl. 49, fig. 7.

Ordnung Ostracoda.

Fam. Primitiidae.

Gattung *Bollia* & *Polyzygia*, p. 168.

Fam. Entomidae.

Entomis serratostriata Sandberger, p. 168, pl. 47, fig. 9.

Gattung Richterina Gürich, p. 169; *R. tenera* Gürich, p. 169, pl. 47, fig. 10.

Prof. H. H. Swinnerton, Classification of Trilobites, remarks, p. 494:

"The Error in Gürich's Classification:

"The mistake made by Gürich is that his main divisions are based on progressive characters, viz: differences in the number of free segments and in the size of the pygidium.

"Beecher's order, Hypoparia, exhibits the same weakness. The institution of an order Protoparia is open to the same criticism."

HADDING, ASSAR. Slaktet Telephus Barrande.—Geol. Foren. Stockh., Forhandl. 35, 1913, pp. 25-48, plates 1, 2.

Telephus bicuspis Ang., p. 43, pl. 1, figs. 1-7; *T. sp.*, p. 42, pl. 2, figs.; *T. mobergi* Hadding, p. 37, pl. 2, figs. 12-17; *T. granulatus* Ang., p. 35, pl. 1, figs. 8-10.

——— Undre Dicellograptusskiffern I. Skone jemte Nägra Därmed Ekvivalenta Bildningar.—Lunds Geologiska Fältklubb, ser. B, No. 6, 1913.

Ostracoda:

Primitia tolli Bonnema, p. 67, pl. 6, figs. 10, 11; *P. carinata* sp. nov., p. 68, pl. 6, fig. 12; *P. conchoides* sp. nov., p. 68, pl. 6, figs. 13-17.

Trilobita:

Triarthrus becki humilis, var. nov., p. 69, pl. 6, figs. 18, 19.

Megalaspis patagiata Törnq., p. 69, pl. 6, figs. 20, 21; *M. sp.*

Asaphus sp.

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HADDING, ASSAR.—Continued.

Ogygiocaris dilatata sarsi Ang., p. 70, pl. 7, figs. 1-7, text fig. 23, pygidium; *O. dilatata lata* var. nov., p. 72, pl. 7, fig. 8, 9; *O. Dilatata strömi* Ang., p. 72, fig. 10.

Nileus armadillo Dalm., p. 72, pl. 7, figs. 11, 12.

Cheirurus exsul Beyr., p. 73, pl. 7, fig. 13.

Ampyx sp.. A. clavifrons sp. nov., p. 73, pl. 7, figs. 15, 16; *A.? costatus* Boeck, p. 74, pl. 7, fig. 17.

Trinucleus coscinorhinus Ang., p. 74, pl. 7, figs. 18-20; *T. efflorescens* sp. nov., p. 75, pl. 7, figs. 21a-c.

Telephus bicuspis Ang., p. 75, pl. 8, figs. 1-4; *T. sp.; T. mobergi* Hadding, p. 76, pl. 8, figs, 6-8; *T. granulatus* Ang., p. 76, pl. 8, figs. 9, 10.

Remopleurides subquadratus sp. nov., p. 76, pl. 8, figs. 11 a, b; *R. circularis* sp. nov., p. 77, pl. 8, figs. 12a, b; *R. sp.* (1); *R. sp.* (2).

Robergia microphthalma Linrs., p. 78, pl. 8, figs. 15-17 and 17a; *R. microphthalma scanica* var. nov., p. 78, pl. 8, fig. 19.

Fialoides antiquatus gen. nov. et sp. nov., p. 79, pl. 8, figs. 20a, b.

The new genus has a fixed cheek and palpebral lobes like the genus *Telephus;* the glabella and pre-glabella-like front brim reminds one of certain Conocephalidae.

Colymbus lovisae gen. nov. et sp. nov.

Cranidium only known. Glabella very convex, with glabellar basal lobes; palpebral lobes bending backward and extending to the base of the glabella, cutting the occipital furrow near the dorsal furrows; facial sutures on their anterior branches running from the palpebral lobes laterally outward and forward and finally crossing the wide part of the fixed cheeks, bow-like, over the frontal limb; glabella not extending to the frontal border.

The form is somewhat similar to species assigned to *Proetus* and *Cyphaspis*, but the facial sutures differ in the strongly outward direction of the anterior branches, also the semicircular palpebral lobes.

On account of these characteristics Hadding referred it to a new genus.

HECTOR, J. On a New Trilobite (*Homalonotus expansus*).—Trans. & Proc. of the New Zealand Inst., Vol. IX, 1877, p. 602.

HEDE, J. ERNHOLD. Skänes colonusskiffer, 1.—Lunds Geologiska Fältklubb, ser. B, No. 9, Bd. 26, No. 6, 1915, pp. 165, plates 1-4, with English summary.

Trilobita:

Ampyx rouaulti Barr.

Dalmanites mobergi sp. nov.; *D. simricus* sp. nov.

Acidaspis mira Barr.; *A. cardiolarum* sp. nov.

Proetus gracilis Barr.

Phyllocardia:

Aptychopsis prima Barr.

Cryptocaris scanica sp. nov.

The new species, *Dalmanites mobergi*, pl. 4, fig. 3-8, is described as follows: Cephalon parabolic, convex; genal angles produced into spines; glabella widening anteriorly, glabellar furrows deep and nearly straight; frontal lobe produced in front, with both exterior sides rectilinear, equaling in length the remaining part of the glabella, not including the occipital ring. Glabella with three pairs of furrows, the first deepest and somewhat oblique, the second perpendicular to the axis and increasing in depth inward, the third nearly parallel with the second, but, in the inmost part a little more directed forward, here being subparallel with the occipital furrow. Occipital ring rather convex, broadest at the middle. Test of the glabella covered with fine granules and scattered, greater and smaller tubercles; also the same kind of granulation to be observed on the cheeks. Flattened lateral border bounded inward by a

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strong furrow, which cannot be followed farther than the frontal lobe. Interior of the cheeks only slightly convex. Eyes, which have big facets, occupying the distance between the first and third lateral furrow. Anterior branch of the facial suture, at first directed a little outward, in the main following the axial furrows; posterior branch at first curving obliquely forward and outward, then turning bacwkard, at last cutting the outer margin at a very acute angle. Thoracic axis about one-third the width of the segments, limited by strong furrows and having a nearly semicircular section.

Dalmanites simricus sp. nov.

Pleurae strongly curved downward in the outer half, furnished with strong, oblique grooves, and ending in points which are slightly bent up.

Test of the thorax covered with fine and close granulation, and the posterior part of each ring with well developed tubercles.

Pygidium nearly semicircular, with the posterior border evenly rounded; length three-fifths of breadth; axis with deep axial furrows, conical, rather convex, occupying four-fifths of the total length and three-tenths of the anterior margin; disregarding the anterior half ring, the axis having eight distinct rings, separated by broad and deep furrows; sides convex, with seven ribs, all of which are well marked, and with an oblique median furrow desisting inside the flat limb; posterior portion of the foregoing segment somewhat elevated above the anterior portion of the following one; axis and sides provided with tubercles which, on the rings, as well as on the lateral lobes, are arranged almost like a string of pearls; granulation quite missing in the furrows, more marked on the posterior than on the anterior portion of each segment. Hypostoma about as long as wide, transversely slightly convex. Anterior margin nearly straight, posterior margin somewhat parabolic; centrum bounded posteriorly by a shallow furrow at the ends of which the maculae are placed, these being directed obliquely forward and outward.

——— Gottlands Silurstratigrafi.—Sveriges Geol. Undersökning, Ser. C, No. 305, 1921, pp. 100, map.

Gives table of the fossils of Gotland, pp. 88-100.

HENNIG, E. Neue Phyllocariden und Isopoden aus rheinischen Unter Devon.—Zeitschr. Deutsch. Geol. Ges., Vol. 72, Monatsh., p. 292, 1921.

HERRMANN, FRITZ. Berichte über die Versammlungen des niederrheinishen geologischen Vereins; beziehungsweise Sitzungsberichte D, beigeheftet den Abhandlungen des Naturhisttorischen Vereins der preussischen Rheinlande und Westfalens, Bonn, 1907; 64 Jahrgang.—Neue Fossilfunde in Hessen, von F. Herrman, (Marburg), p. 40.

Bei Hermershausen, unweit Marburg, fanden sich in Kalkknellen, die anstehend zwar nicht bekannt sind, die wir aber nach der in ihnen enthaltenen Fauna als Einlagerungen in den Wissenbacher Schiefern vom ungefähren Alter des Ballersbacher Kalkes auffassen müssen, zahlreiche Pygidien und Kopfschilder des bekannten *Trimerocephalus micromma* A. Röm., *Phacops fugitivus* Barr.

Interessant ist dieses Vorkommen einmal wegen der lokalen Häufung diese sonst nur vereinzelt in den Schiefern, ganz selten aber in den Kalkeinlagerungen (Laddekenthal, Leun) auftretenden Trilobiten, dann aber auch besonders aus den Grunde, dass wir hier zum ersten Male eine Menge gut erhaltener Pygidien dieser sonst nur nach ihren Kopfschildern bestimmten Art vor uns haben.

Die einzige erwähnenswerte Abbildung eines Pygidiums findet sich bei Barrande (Syst. sil. I Suppl. Taf. IX, fig. 2), stellt jedoch nur einen Steinkern dar. Das Pygidium zeichnet sich nun durch starkes zurücktreten der Segmentation aus, der art, dass auf der Oberfläche meist überhaupt nichts mehr davon zu bemerken ist und ein Habitus zu Stande kommt, der allerdings sehr an den der untersilurischen Asaphiden (Z. d. D. g. G. 1906, Monatsberichte, p. 213, p. 41) erinnert. Hingegen ist auf der Unterseite der Schale sowie auf

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HERRMANN, FRITZ.—Continued.

dam Steinken eine schwache, aber deutliche Segmentation verhanden, entsprechend derjenigen, die wir auf der erwähnten Barrandeschen Abbildung wahrnehmen.

Trimerocephalus micromma gilt seit langer Zeit als Leitfossil der Wissenbacher Schiefer. Ich vermute, dass alle die schwach oder kaum geripppten Pygidien, die sich in diesen Schichten finden hierher zu rechnen sind. Ein Vergleich mit den sonst noch auftretenden Phacopiden aus der Gruppe des *Ph. fecundus*, (*fecundus, breviceps, zorgensis*, etc.) die sich sämtlich durch ganz grob geripte, z. Tl. auch granulirte Pygidien auszeichnen, läst eine Verwechslung mit den Pygidien von *Trim. micromma* selbst bei weitgehender Verdrückung oder Auswalzung ausgeschlossen erscheinen.

Trim. micromma ist demnach nicht nur in seinen Kopfschildresten, sondern auch in seinen Pygidien bei der allgemeinen Fossilarmut der Wissenbacher Schiefer ein brauchbares Leitfossil, das bereits in weitentfernten Gebieten (Catalonein, Rheinisches Schiefergebirge, Harz, Thüringen, Böhmen) in äquivalenten Schichten (Stufe des Ballersbacher Kalkes) gefunden worden ist.

——— Ueber das Paläozoicum am Ostrande des Rheinischen Schiefergebirges.—Jahrb. des Nassauischen Vereins für Nat. in Wiesbaden, 64 Jahrg. 1911, pp. 1-49, plates 3.

Crustacea, pp. 27-34.

Trimerocephalus micromma A. Roemer, p. 27, pl. 2, figs. 1a-c.

Phacops kayseri sp. nov., p. 29, pl. 1, fig. 5; pl. 2, figs. 2a-c.

Cheirurus gibbus Beyrich, p. 30, pl. 2, fig. 3.

Cyphaspis hydrocephala A. Roemer, p. 30, pl. 2, fig. 4; *C. coronata* Barr., p. 31, pl. 2, fig. 5.

Proetus aff. dormitans Richt., p. 32, pl. 2, fig. 6; *Proetus* sp., p. 33, pl. 2, fig. 7.

Entomis sp., p. 34.

——— Das hercynische Unterdevon bei Marburg a. L.—Jahrb. der Königl. Preuss. Geol. Landesanstalt für 1912, Bd. XXXIII, Theil 1, Heft 2, pp. 305-395, plates 18-23, with Geological Map.

Crustacea.

Kalkige Grauwacke.

Phacops fecundus major Barr., p. 321.

Dalmanites cf. *tuberculatus* A. Roem., p. 321.

Proetus eremita Barr., p. 322.

Bronteus sp., p. 323.

Kalk mit *Rhynchonella princeps*.

Phacops fecundus major Barr., p. 343, pl. 20, figs. 1a, b.

Dalmanites (*Odontochile*) *tuberculatus* A. Roem., p. 344, pl. 20, fig. 2a, b.

Cyphaspis hydrocephala A. Roem., p. 345, pl. 20, figs. 3a, b.

Acidaspis cf. *glabrata* A. Roem., p. 343.

Proetus marburgensis sp. nov., p. 346, pl. 20, figs. 4a, b.

Schönauer Kalk.—Knollenschiefer.

Phacops sternbergi Corda, p. 359, pl. 22, fig. 1; *P. intermedius* Barr., p. 360, pl. 22, figs. 2, 3; *P. zorgensis* Kayser, p. 361, pl. 22, figs. 4a, b; *P. bronni* Barr., p. 361, pl. 22, fig. 5.

Trimerocephalus aff. micromma A. Roem., p. 362, pl. 22, figs. 6, 7; *T. sp.*, p. 362.

Cheirurus (*Crotalocephalus*) cf. *gibbus* Beyrich, p. 363, pl. 22, fig. 14.

Lichas sexlobatus A. Roem., p. 363, pl. 22, fig. 9.

Proetus lepidus Barr., p. 365, pl. 22, figs. 10-11; *P. sp.*, p. 366, pl. 22, fig. 12.

Dalmanites (*Odontochile*) cf. *reussi* Barr., p. 366, pl. 22, fig. 13.

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——— Neue Fossilfunde in Hessen (Silurian Trilobites).—Sitz. naturh. Ver. Preuss. Rheinl., 1907, pp. 40-41, 1908.

HOLUB, K. Ueber eine neue Fauna des Untersilurs in der Umgebung von Rokycany und Nachträge.—Bull. Internat. Acad. des Sciences de Bohéme, 1911 and 1912.

HOLM, G. Kinnekulle Des Geologi och den Tekniska Anvàndningen af dess Bercarter.—Sveriges Geol. Undersökning, Ser. C, No. 172, 1901.

Illustrates *Agnostus parvifrons* Linrs.; *A. laevigatus* Dalm.; *A. pisiformis* Linné.

Leperditia primordialis Linrs.

Sphaerophthalmus alatus Boeck.

Peltura scarabaeoides Wahl.

Ceratopyge forficula Sars.

Euloma ornatum Ang.

Niobe insignis Linrs.

Pygidium of *Megalaspis limbata* Boeck; *M. heros* Dalm.

Chasmops sp.

Beyrichia costata Salter.

Cryptolithus wahlenbergi Rouault.

Pygidium of *Homalonotus platynotus* Dalm.

Dalmanites mucronatus Brogn.

HOLTEDAHL, DR. OLAF. The Cambrian-Ordovician Beds of Bach Peninsula and the Neighboring Ellesmere Land.—Videnskabs-Selskabet of Kristiania, 1913, No. 28, of the Report on the Second Norwegian Arctic Expedition in the Fram, 1898-1902.

Dr. Holtedahl figures a cranidium and a free cheek and pygidium as *Ptychoparia sp.* from Cape Camperdown.

From the *Orthoceras* limestone of Cape Victoria Head Dr. Holtedahl figures a cranidium of another *Ptychopyge* and a cranidium of *Illaenurus,* also a *Bathyuriscus* with a figure of a pygidium.

From Norman Lockyer Island, about eight miles directly north of Victoria Head, Dr. Holtedahl lists, with other fossils, *Thaleops ovatus* Conrad.

——— On the Fossil Fauna as from Pere Schei's Series B in Southwestern Ellesmere Land.—Videnskabs-Selskabet of Kristiania, 1914, No. 32 of the Report on the Second Norwegian Arctic Expedition in the Fram, 1898-1902.

Dr. Holtedahl lists three Niagaran species and *Ceraurus sp.*

——— Ueber einige Norwegischen Oleniden.—Norsk. Geol. Tidsskr., Vol. 2, 1910, pp. 1-24, plates 1-3.

Parabolina spinulosa, pl. 2, fig. 13.

Leptoplastus ovatus, p. 8, pl. 1, figs. 4-9; *L. bröggeri* sp. nov.; *L. explanatus* sp. nov.; *L. longispinus* sp. nov.

Peltura praecursor, p. 14, pl. 2, figs. 1-10.

Eurycare norvegicum sp. nov.

HOLZAPFEL, E. Das Obere Mitteldevon (Schichten mit *Stringocephalus burtini* und *Maeneceras terebratum*) im Rheinischen Gebirge.—Abhandl. der Königlich Preuss, Geol. Landesanstalt, N. F., Heft 16, 1895.

Crustacea.

Trilobita:

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HOLZAPFEL, E.—Continued.

Bronteus novaki sp. nov., p. 10, pl. 2, figs. 11-14; *B. sp.; B. granulatus* Goldf., p. 13, pl. 13, figs. 5-10; pl. 16, fig. 18.

Phacops koeneni sp. nov., p. 16, pl. 2, figs. 8-10; *P. breviceps,* p. 18, pl. 12, figs. 10, 14; *P. batracheus* Whidb., p. 20, pl. 3, fig. 13; *P. latissimus* sp. nov., p. 21, pl. 3, fig. 14; *P. hyla* sp. nov., p. 21, pl. 3, fig. 12.

Cheirurus sternbergi Boeck, p. 22, pl. 1, figs. 2-4; pl. 2, figs. 15, 16; pl. 3, figs. 1-10; pl. 12, fig. 15.

The author refers the following species to the synonymy of this species:

Ch. myops Roemer, 1850, *Ch. gibbus* Sandberger, 1856, *Ch. articulatus* Salter, 1864, *Ch. myops* Holz., 1882, and *Ch. pengellii* Whidborne, 1889.

Lichas decheni sp. nov., p. 30, pl. 5, fig. 5; pl. 17, figs. 17, 18, 20; *L. araneus* sp. nov., p. 32, pl. 3, fig. 11; p. 13, figs. 1-3, 16.

Proetus crassirhachis A. Roemer, p. 35, p. 1, figs. 6, 8, pl. 2, fig. 22; *P. quadratus* Maurer, p. 35, pl. 12, fig. 9; *P. crassimargo* Roem., p. 36, pl. 1, figs. 7-9, 18; pl. 2, figs. 22, 25; *P. suborbitatus* sp. nov. p. 38, pl. 13, figs. 13, 14, 17-19; *P.* cf. *astyanax* Corda, p. 40, pl. 13, fig. 1.

Cyphaspis convexa Corda, p. 40, pl. 2, fig. 6; *C. cerberus* Barr., p. 42, pl. 2, figs. 5, ?21.

Arethusina kayseri sp. nov., p. 43, pl. 2, fig. 7; *A. beyrichi* Novak, p. 44.

Harpes socialis sp. nov., p. 45, pl. 1, fig. 1; pl. 2, figs. 1, 3; *H.* cf. *macrocephalus* Golf. p. 47.

Ostracoda:

Aristozoe sp., p. 48, pl. 13, fig. 22.

HUBBARD, G. D. See STAUFFER, CLINTON B.

HUNEFELD, F. L. Chemische Untersuchung der Deckelitheile der Entomostraciten Trilobiten.—Schweigger's Journal, 1831, and Isis.

JAEKEL, O. Ueber einen neuen Phyllocariden aus dem Unterdevon der Bundenbacher, Dachschiefer.—Zeitscher, Deutsch Geol. Ges., Vol. 72, 1921, pp. 290-292, fig.

JAROSZ, J. Fauna des Kohlenkalk in der Umgebung von Krakan, Ier. Theil, Trilobiten.—Bull. Intern. Acad. Sci. Cracovie, 1909, pp. 371-384, Pl. XI.

JULIEN, A. Le Terrain Carbonifère Marin de la France Centrale.—Paris, 1896, pp. I-XXIV, 1-304, Figs. in text, plates I-XVII.

KATZER, F. Entgegnung auf Herrn Dr. J. F. Pompeckj's Bemerkungen in diesen Verhandlungen (*Ellipsocephalus germeri*).—Verh. K. K. Geol. Reichsanst, 1900, p. 370.

KAYSER, E. Devonfossilien vom Bosporus und von der Nordküste des Marmara-Meeres.—Beiträge zur Palaeont. Oest-Ung. 12, Heft 1, 1898.

KEGEL, WILHELM. Der Taunusquarzit von Katzenelnbogen.—Abhandl. der Königlich preuss. Geol. Landesanstalt, N. F., Heft 76, 1913, pp. 1-162, with 6 plates.

Trilobita:

Homalonotus (*Digonus*) *rhenanus* Koch, p. 27, pl. 2, fig. 2; *H.* (*Digonus*) *aff. gigas* F. A. Roem., p. 28, pl. 2, fig. 3; *H. ornatus* Koch, p. 30, pl. 2, fig. 4; *H sp.,* p. 31, pl. 2, fig. 5.

Cryphaeus drevermanni Richter, p. 32, pl. 6, fig. 2; *C. richteri* sp. nov., p. 33, pl. 2, fig. 7; *C. sp.,* p. 34, pl. 2, fig. 8; *C. intermedius* sp. nov., p. 36, pl. 2, fig. 9.

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Ostracoda:

Kloedenia kayseri sp. nov., p. 38, pl. 2, fig. 10.

Beyrichia nassoviensis sp. nov., p. 39. pl. 2, fig. 1; *B. roemeri* Kayser, p. 40, pl. 2, fig. 12.

KERFORNE, F. Le Niveau à *Trinucleus bureaui* dans le Massif Armoricain et en particulier dans la Presqu'ile de Crozon.—Bull. Soc. Sci. N. Med. Ouest Rennes, Vol. 4, 1895, p. 248-250.

——— Description de Trois Nouveau Trilobites de l'Ordovicien de Bretagne.—Bull. Sci. Géol. France, Ser. 3, Vol. 29, 1890, pp. 783-791, pl. 13.

KIAER, — The Lower Cambrian *Holmia* Fauna at Tømten in Norway.—Kristiania, 1919, 4 to 14 plates.

KING, W. B. R. Sedgwick Museum Notes: Notes on the Genus *Sphaerocoryphe*.—Geol. Mag., Vol. 57, 1920, pp. 532-534, plate 13.

Sphaerocoryphe thompsoni Reed.

The author remarks:

A study of the hypostoma of *Staurocephalus* confirms the view that it should be removed from the Cheiruridae, but it does not seem to indicate that it should be put into the Encrinuridae, unless it branched off from some very early form before the characteristic frontal tongue was developed.

The hypostoma of *Sphaerocoryphe thompsoni* is similar in type to the typical Cheirurid hypostoma, such as *C. bimucronatus*. In *Deiphon* there is the same central spherical raised portion separated by the marked groove from the raised marginal ring. The hypostoma of *Sphaerocoryphe thompsoni* is slightly smaller than the swollen frontal part of the glabella, the general outline is square, formed of a large central, raised elliptical portion, surrounded by a deep, wide groove and raised narrow margin. At the lateral extremity of the frontal ridge the groove reaches the margin of the hypostoma, thus forming a break in the raised marginal ring. This also makes two notches in the general square outline. The lateral margins are raised and thickened. The central part of the posterior border is bent slightly towards the center of the hypostoma. There are indications of a small pit in the groove opposite the posterior edge of the notch. Surface finely granulated.

KITTL, ERNST. Geologie der Umgebung von Sarajevo.—Abd. Johrbuche der K. K. Geol. Reichsanstalt, Bd. 53, Heft 4, 1903.

Phillipsia bittneri sp. nov., p. 680, pl. 21, figs. 30-32.

Kittle gives this new name for Bittner's *Phillipsia* sp., Jahrb. der k. k. Geol. R. A., p. 365. 1880.

A somewhat similar form to the new species is *Proetus posthumus* Richter, 1864, from the Culm beds of Thuringia.

KLOUCEK, CELDA. Nàlez Trilobitü vd/1 a.—Zvlastni otisk Z. vestniku Kral. Ceské Spolecnosti Nauk. U., pp. 1-5, Praze, 1914.

Resumé en allemand Trilobitenfund in d/1 a Prage, 1914.

The author announces the discovery in the Southeast of Bohemia, environs of St. Benigna, of a fauna of Trilobites belonging to the families Olenidae, Asaphidae and Cheiruridae.

——— Ueber den Geologischen Horizont des Erzlagers bei Karyzek.—Bull. Internat. Acad. Sci. de Bohème, 1913, pp. 1-5, plate.

Illaenus perneri sp. nov. Remarkable for the subtrapezoidal form of its pygidium.

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KLOUCEK, CELDA.—Continued.

——— Ueber die d/1 Schichten und ihre Trilobitenfauna.—Bull. Internat. Acad. Sci. de Bohème, 1916, pp. 1-16, plate.

The author mentions that certain forms have affinities with Cambrian genera. *Dicellocephalus* (*Dicellocephalina*) *bohemica* reappears in d/1.

The new genus and species are listed in Novak & Perner's paper, 1918.

Trilobiten in d. y. a. p. 8.

Aeglina prisca Barr., p. 9; *Ae. prisca synophthalma* Klou., p. 9; *Ae. princeps praecedens* Klou., p. 9; *Ae. kossleri* Holub, sp. nov., p. 9; *Ae. bergeroni* Novak, p. 9.

Bohemilla stupenda praecedens Klou., p. 10.

Dalmanites atavus Barr., p. 10; *D. barroisi* Novak, p. 10.

Dikelocephalina (*Dicellocephalus*) *bohemica* Novak p. 10.

Dionide prima Klou.

Holometopus (*Illaenus*) *bohemicus* Barr., p. 11.

Barrandia bohemica Novak, p. 11.

Bumastus avus Holub, p. 11; *B. pragensis* Klou.

Illaenus cf. *advena* Barr., p. 11.

Agnostus tullbergi Novak, p. 12; *A. perrugatus caducus* Barr., p. 12.

Trilobiten in d/1 y b.

Aeglina speciosa synophthalma Klou., p. 13; *Ae. princeps* Barr., p. 13, plate, fig. 7; *Ae. prisca longicephala* Klou., p. 13; *Ae. monophthalma* Klou., p. 13, plate, fig. 4.

Ampyx sp. nov., p. 14.

Placoparia zippei tumida Klou., p. 14.

Platypeltis ? longicauda Klou., p. 14.

Bohemilla stupenda Barr., p. 14, plate, fig. 10.

Trinucleus bucklandi praecedens Klou., p. 14.

Dalmanites oriens mytoensis Klou., p. 15; *D. atavus novaki* Klou., p. 15.

Illaenus perneri? glabra Klou., p. 15.

Sarkia bohemica Klou., gen. nov. et sp. nov.

——— Le genre *Bohemilla* Barrande.—Bull. Internat. Acad. Sci. de Bohème, 1920.

Bohemilla stupenda Barr., fig. in text.

The author remarks that there is as much difference between *Aeglina* and Bohemilla as there is between *Aeglina* and *Telephus*. He gives a table showing these differences.

KNOD, REINHOLD. Devonische Faunen Boliviens.—Neues Jahrb. für Min. Beil, Bd. 25, 1908, pp. 493-600, pl. 21-31.

Trilobita:

Acaste acutilobata sp. nov., p. 497, pl. 21. figs. 5, 5b, pl. 31, fig. 5; *A. convexa* Ulrich, p. 499, pl. 21, fig. 4.

Dalmanites clarkei Ulrich, p. 500; *D. maccurua* Clarke, p. 500, pl. 21, fig. 3.

Cryphacus giganteus Ulrich, p. 501, pl. 21, fig. 2.

Phacops sp., p. 501; *Homalonotus kayseri* Thomas, p. 502.

Ostracoda:

Beyrichia argentina Thomas, p. 502.

KNOD, R. VON, and STEINMANN, —. Beiträge zur Geologie und Palaeontologie Südamerikas. Neues Jahrb. für Min., Vol. 25, 1908, p. 493-600, pl. 21-31.

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KOENEN, A. VON. The Culm Fauna from Herborn.—Neues Jahrb. für. Min. Geol. Palaeont., 1879, p. 309, plates 2.

Dr. Koenen gives descriptions, but does not figure *Phillipsia aequalis* H. von Meyer or *P. latispinosa* Sandberger.

The author (p. 312) places Richter's *Proetus posthumus* with von Meyer's species *Phillipsia aequalis* and observes "As von Meyer expressly says that the glabella is reduced in front, there is no doubt that Burmeister was in error in figuring as this species a form with a club-shaped glabella."

Woodward remarks that Emmrich's restored figure does not give a good representation of the species, the cephalon is too long, the eyes placed too far in front, and the glabella too slightly reduced in front.

Kayser, and also Leyh, refer *Phillipsia latispinosa* Sandb. to *P. aequalis*. Leyh's figure, pl. 17, fig. 3, of *P. aequalis* has the genal angles of the cephalon extended in somewhat long spines.

——— Ueber die Organization der Trilobiten.—Verhandl. d. Nat. Ver. d. Preussreindl. &c., Vol. 29, 1872, pp. 93-95.

——— Unterseite Trilobiten.—Neues Jahrb. f. Min., Bd. 1, 1880 pp. 430-432, pl. 8.

KOZLOWSKI, R. Fossiles Dévoniens de l'Etat de Paraná (Brésil).—Ann. Paléont., Paris, Vol. 8, 1913, pp. 105-123, pl. XI-XIII.

LAKE, PHILIP. A Monograph of the British Cambrian Trilobites.—Palaeontographical Soc., 1917; Part V, 1919, pp. 89-120, pl. 11-14.

Crustacea:

Ctenopyge directa sp. nov.

Leptoplastus salteri (Callaway). This is the *Conocoryphe salteri* of Callaway, 1874, p. 196.

Eurycare sp.

Peltura scarabaeoides (Wahl.); *P. punctata* C. & S.; *P. olenoides* (Salter).

Beltella gen. nov., Genotype *B. depressa* (Salter).

Cephalon semicircular, with broad margin, genal angles produced into spines. Glabella quadrate or conical, truncate or rounded in front, separated from the marginal furrow by a frontal limb as wide as, or wider htan the margin; outer surface of the test of the glabella probably devoid of furrows, but the internal casts usually showing two pairs, the posterior pair being very oblique and nearly reaching the occipital furrow.

Facial suture starting at the outer edge of the anterior margin, close to the middle line, and running very obliquely outward across the margin; from the inner edge of the margin passing inward to the eye and thence outward to the posterior margin, cutting it well within the genal angle.

Thorax, 12 segments.

Pleurae, outer part bent down and faceted; in the anterior segments the terminations appearing to be rounded or bluntly pointed; in the later segments falcated or spined.

Pygidium small and entire.

The eyes of *Beltella* are placed farther forward than in *Loganellus*, *Liostracus* or *Ptychoparia*, and the ocular ridge is much less distinct.

Protypus hitchcocki (Whitfield) shows many points of resemblance to *B. depressa*. The general shape is similar, the glabellar furrows are obsolete, the number of thoracic segments is the same, the pleural grooves are of the same character and the tail is small and entire. But the ocular ridge is much more strongly marked, and the facial suture is describbed as cutting the margin at right angles. The divergent course of the anterior branches of the facial suture distinguishes *Beltella* from all the other genera of Olenidae, sensu lato, except *Parabolinella*.

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LAKE, PHILIP—Continued.

Beltella bucephala (Belt); *B. varisimilis* (Salter).
Parabolinella simplex (Salter)
Angelina sedgwicki (Salter).
Dikelocephalus discoidalis Salter; *D. celticus* Salter.
Dikelocephalina furca (Salter).
Apatokephalus.

——— The Limbs of Trilobites.—Knowledge, Vol. XIX, 1896, p. 68.

LAMANSKY, W. Die Aeltesten Silurischen Schichten Russlands, Etage B.—Mémoires du Comité Géologique Nouvelle, Série Livr. 20, 1905.

Trilobita:

Asaphus lepidurus and Megalaspis gibba, p. 58, B/y.

Asaphus expansus and A. lamanskyi, p 56, B/a.

Asaphus raniceps, p. 58, B/3, b.

Asaphus eichwaldi and Ptychopyge globifrons, p. 59, B/3, y.

Asaphus, sensu stricto, p. 61.

Asaphus priscus sp. nov., p. 61.

Asaphus bröggeri; A. lepidurus; A. expansus; A. lamanskyi; p. 62.

Asaphus acuminatus; A. raniceps; A. major; A. eichwaldi; p. 63.

Onchometopus volborthi; O. schmidti sp. nov., pl. 1, fig. 4; *O. stacyi;* p. 63.

Nileus armadillo; Niobe laeviceps; N. linnarssoni; N. frontalis; N. emarginula; Pseudasaphus globifrons; P. tecticaudatus; Ptychopyge angustifrons; p. 65.

Ptychopyge wöhrmanni, p. 67.

Ptychopyge inostranzewi sp. nov., pl. 1, fig. 5.

Megalaspis leuchtenbergi sp. nov., pl. 1, fig. 2.

Megalaspis pogrebowi, pl. 1, fig. 3.

Illaenus esmarckii; I. laticlavus; I. ladogensis; I. centrotus; p. 67.

Pterygometopus selerops; P. trigonocephalus; Cheirurus ornatus; C. in gricus; Cyrtometopus clavifrons; C. affinis; p. 68.

Cyrtometopus cf. *aries; C. gibbus; C. tumidus; Amphion fischeri; A. brevicapitatus* sp. nov., B/3/by; *Cybele bellatula genuina;* p. 69.

Metopias celorrhina, and var. *coniceps; M. pachyrrhina; M. verrucosa; Harpes spaskii; Remopleurides nanus; Ampyx linnarssoni; A. nasutus; A. volborthi;* p. 70.

Triarthrus angelini Linrs., pl. 1, fig. 1.

LANKESTER, E. RAY. Extinct Animals. London, 1905, pp. I-XXII, 1-331, 292 Illustrations.

Lankester associated the Trilobites with the Meostomata in the Arachnida.

LA TOUCHE, J. D. Handbook on the Geology of Shropshire.—London, 1884, with 21 plates.

Order Trilobita, pp. 37-41.

Fam. 1. Remopleuridae, *Remopleurides* sp., pl. 3, fig. 57, Caradoc.

Fam. 2. Olenidae, *Olenus salteri,* pl. 1, fig. 7; *O. triarthrus,* pl. 1, fig. 6, Longmynd.

Fam. 3. Conocephalidae, *Conocoryphe monile,* pl. 1, fig. 9, Longmynd.

Fam. 4. Phacopidae, *Phacops caudatus,* pl. 10, fig. 249; *P. longicaudatus,* pl. 10, fig. 250; *P. downingiae,* pl. 10, fig. 246, Wenlock.

Phacops macrourus, pl. 3, fig. 66; *P. apiculatus,* pl. 3, fig. 67, Caradoc.

Fam. 5. Calymenidae, *Calymene blumenbachii,* pl. 10, fig. 242; *C. tuberculosa,* pl. 10, fig. 243, Wenlock.

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Calymene parvifrons, pl. 1, fig. 22, Tremadoc
Calymene cambrensis, pl. 2, fig. 40, Landeilo.
Calymene caractaci, pl. 3, fig. 61, Caradoc.
Homalonotus delphinocephalus, pl. 10, fig. 250, Wenlock.
Homalonotus knighti, pl. 17, fig. 556, Ludlow.
Homalonotus bisulcatus, pl. 3, fig. 62, Caradoc.
Fam. 6. Proetidae, *Proetus stokesii*, pl. 10, fig. 257; *P. latifrons*, pl. 10, fig. 258, Wenlock.
Genus *Cyphaspis*.
Genus *Phillipsia*, *Phillipsia seminifera*, pl. 20, fig. 714, Carboniferous.
Fam. 7. Lichadae, *Lichas anglicus*, pl. 10, fig. 259, Wenlock.
Lichas laxatus, pl. 3, fig. 63, Caradoc.
Fam. 8. Acidaspidae, *Acidaspis barrandei*, pl. 10, fig. 237; *A. brightii*, pl. 10, fig. 239-241, Wenlock.
Acidaspis caractci, pl 3, fig. 64, Caradoc.
Fam. 9. Trinucleidae, *Trinucleus lloydii*, pl. 2, fig. 32; *T. gibbsii*, pl. 2, fig. 33, *Arenig*.
Trinucleus murchisoni, pl. 1, fig. 19, Tremadoc.
Trinucleus concentricus, pl. 3, fig. 55, Caradoc.
Genus *Ampyx nudus*, pl. 2, fig. 35; *A. salteri*, pl. 2, fig. 34, Arenig.
Ampyx pennatus Salt. Mss., pl. 3, fig. 56, Caradoc.
Fam. 10. Asaphidae, *Asaphus homfrayi*, pl. 1, fig. 10; *A. crofftii*, pl. 1, fig. 11, Longmynd.
Asaphus tyrranus, pl. 2, fig. 38, Arenig.
Asaphus powisii, pl. 3, fig. 59, Caradoc.
Genus *Ogygia buchii*, pl. 2, fig. 39, Llandeilo.
Ogygia selwynii, pl. 1, fig. 21, Tremadoc.
Fam. 11. Illaenidae, *Illaenus davisii*, pl. 3, fig. 58, Caradoc.
Illaenus nexilis, pl. 10, fig. 261; *I. insignis*, pl. 10, fig. 262; *I. barriensis*, pl. 10, fig. 268, Wenloc.k
Illaenus perovalis, pl. 2, fig. 36, Arenig.
Illaenus bowmani, pl. 5, fig. 110; *I. thompsoni*, pl. 5, fig. 112, Llandovery.
Fam. 12. Aeglinidae, *Aeglina binodosa*, pl. 1, fig. 20, Tremadoc.
Aeglina mirabilis, pl. 2, fig. 37, Arenig.
Fam. 13. Cheiruridae, *Cheirurus bimucronatus*, pl. 6. fig. 113, Llandovery.
Cheirurus sedgwicki, pl. 2, fig. 41, Arenig.
Genus *Sphaerexochus mirus*, pl. 10, fig. 254-256, Wenlock.
Fam. 14. Encrinuridae, *Encrinurus punctatus*, pl. 6, fig. 114, 115, Llandovery.
Encrinurus variolaris, pl. 10, fig. 253, Wenlock.
Genus *Cybele verrucosa*, pl. 3, fig. 60, Caradoc.
Fam. 15. Agnostidae, *Agnostus dux*, Longmynd.
Agnostus mccoyi, pl. 2, fig. 31, Arenig.
Lichapyge cuspidata, pl. 1, fig. 12, Longmynd.
Conophrys salopienis pl. 1, fig. 8, Longmynd, (referred to *Shumardia*).
Ostracoda:
Genus *Leperditia gracilenta*, pl. 22, fig. 801-804.
Genus *Beyrichia complicata*, pl. 3, fig. 54, Caradoc.
Beyrichia kloedeni, pl. 10, fig. 238, Wenlock.
Eurypteridae, *Eurypterus acuminatus*, pl. 17, fig. 558, Ludlow.
Eurypterus lincaris, pl. 17, fig. 559; *E. megalops*, pl. 17, fig. 560; *E. brodiei*, pl. 17, fig. 566; *E. pygmaeus*, pl. 17, fig. 557; *E. symondsii*, pl 17, fig. 561.
Pterygotus ludensis, pl. 17, fig. 567, Ludlow.
Pterygotus problematicus, pl. 17, fig. 588; *Pterygotus*, pl. 21, fig. 823.

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LA TOUCHE, J. D.—Continued.

Stylonurus.

Suborder Xiphosurus.

Hemiaspis limuloides, pl. 17, fig. 569-570; *H. salweyi,* pl. 22, fig. 807; *H. limuloides optatus,* pl. 17, fig. 569, Ludlow.

Phyllopoda.

Hymenocaris.

The carapace which covers the fore part of the body is not apparently bivalved, and is somewhat triangular. There are nine segments of the body and the last bears three spiked appendages, setae.

Ceratiocaris pardoensis, pl. 17, fig. 563, Ludlow.

Ceratiocaris sp., pl. 17, fig. 564; *C. murchisoni,* pl. 17, fig. 565; *C. leptodactylus,* pl. 17, fig. 566; *C. (Physocaris) vesica,* pl. 22, fig. 816.

LAURIE, M. A Reconstruction Trilobite.—Nature, Vol. 38, p. 26.

LERICHE, M. La Faune du Gedinnien, Interieure de l'Ardenne.—Mém. Mus. Roy. Hist. Nat. Belg., Vol. 6, 1912, pp. 1-58, figs. 1-3.

Ostracoda:

Primitia jonesi De Koninck, p. 42, pl. 3, figs. 4-6.

Beyrichia kloedeni McCoy; *B. sp.,* p. 44, pl. 3, fig. 8.

Ordre des Trilobites:

Homalonotus roemeri De Koninck, p. 45, pl. 3, figs. 10-12.

Acaste downingiae Murch., p. 47, pl. 3, figs. 8, 9, fig. 4 in text.

LERICHE, M. See GOSSELET, J. A. A.

LIEBER, HUGO. Beiträge zur Geol. eds Reinberggebietes bei Marburg.—Palaeont. Abschnitt, überarbeitet durch E. Huffner, 1917, pp. 98, plates 12.

Trilobita:

Proetus (aff.) dormitans Richt., p. 54; *P. eremita* Barr., p. 55, pl. 6, fig. 6; *P. waldschmidti* Novak, p. 55, pl. 6, fig. 4; *P. sp.*

Phaetonellus planicauda Barr., p. 56.

Tropidocoryphe filicostata Novak, p. 56, pl. 8, fig. 10.

Cyphaspis hydrocephala A. Roem., p. 57.

Phacops fecundus major Barr., p. 57, pl. 8, fig. 7; *P. breviceps* Barr., p. 58, pl. 7, figs. 1, 1b.

Harpes sp., p. 58, pl. 6, fig. 7.

Acidaspis pigra Barr., p. 59, pl. 6, fig. 5; *A. hoernesi* Barr., p. 59, pl. 8, fig. 9.

Bronteus dormitzeri Barr., p. 60, pl. 6, fig. 8; *B. granulatus* Goldf., p. 60, fig. 2.

Thysanopeltis speciosus Corda, p. 60, pl. 8, fig. 8.

LOCZY, VON L. Beschreibung d. foss. Säugethier, Trilobiten und Mollusken-Reste u. d. Palaeont. Stratigraph.—Resultate d. Graften B. Széchenyi en Ostasien. Bidazy, 1898, 11 plates, 22 figures.

LUDWIG, RUDOLPH. *Dithyrocaris* aus dem Rheinischen Devon-Gebirge.—Palaeontogr., Bd. XI, pp. 309-310, pl. 50.

Dithyrocaris kochi sp. nov.; *D. breviaculeata* sp. nov.

——— Devonischen Versteinerungen von Lagoinha in Matto Grosso, Brasil.—Zeitschr. d. Ges. für Erdkunde zu Berlin, Vol. 38, pp. 1-15.

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MAILLEUX, EUGENE. Quelques Notes sur les Trilobites du Couvinien des Environs de Couvin.—Proc. Verb. Soc. Belge de Géologie, Tome XVII, p. 579.

The author gives a list of the Trilobites of the Devonian of Couvin with figures and description of a new species, *Proetus barroisi*. This species has been referred to the genus *Tropidocoryphe* by Rud. & E. Richter, 1919, p. 26, fig. 2, a figure of an entire specimen.

——— Note sur l'Hypostome de *l'Homalonotus rhenanus* Koch.—Bull. Soc. Belge de Géol., Tome XXV, 1911, p. 113, fig. in text.

The author figures the hypostoma of *Homalonotus rhenanus* after Beuhausen's fig. 6 from Oberstadtfeld. This form differs from that from Mormont in having a much wider, more limited and flatter shape, and in other minor differences. The fig. 2 of the Mormont hypostoma exhibits a forked form characteristic of that of *Homalonotus dekayi*.

——— Sur deux Pygidia du *Bronteus flabellifer* Goldfuss.—Bull. Soc. Géol. Brux., Tome XXI, 1908, p. 255.

——— Quelques Remarques sur la Faune du Hundsrücken Inférieure du Bassin du Luxembourg.—Bull. Soc. Belge de Géol., Tome XXVIII, 1914, pp. 77-79.

In addition to the list of Devonian Trilobites, the author notes the presence of *Lichas* and *Bronteus in the Hundsrückien* lower beds of Longlier.

M. Asselbergs's list included *Homalonotus planus* (Juseret), *H. ornatus* (Martelange), *H.* cf. *multicostatus* (Warmifontaine), *H. armatus?* (Royvaux), *Phacops ferdinandi?* (Warmifontaine), *Dalmania* (*Odontochile*) cf. *spinifera* (Martelange), *Cryphoeus drevermanni* (Royvaux), Proetus dispersus (Juseret).

——— Remarques sur la Faune Trilobitique de l'Assise des Schistes et Calcaires à *Calceola sandalina* du Bord Sud du Bassin de Dinant.—Bull. Soc. Belge de Géol., Tome XXIX, 1919, pp. 52-55.

Gives a list of the Trilobites of the Devonian of this Basin.

——— The Palaeozoic Formation of the Southern Part of the Dinant Basin.

List of Trilobites.

Ordovician Schistes de Mondrepuits.

Acaste downingiae; Homalonotus roemeri.

Devonian Siegenian (corresponds approximately to the Siegenerschichten of the Rhine).

Homalonotus crassicauda; Asteropyge laciniatus.

Assise de Hauffalize (Hundsrückian).

Homalonotus sp.; *Asteropyge laciniatus.*

Emsian (Coblenzschichten of the Rhine).

Assise de Vireux (Lower Coblenzschichten).

Homalonotus cf. *planus; H. rhenanus.*

Assise de Hierges (Two horizons).

Homalonotus, Lower beds.

Homalonotus; Asteropyge laciniatus; Upper beds.

Eifelian or Middle Devonian.

Couvinian.

Assise du Bure.

Phacops schlotheimi; Acidaspis radiata; Lichas armatus; Asteropyge punctatus.

Assise de Couvin.

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MAILLEUX, EUGENE.—Continued.

Phacops latifrons; P. schlotheimi; Asteropyge punctatus; Goldius flabellifer; Proetus holzapfeli; P. cuvieri; Acidaspis radiata; Eudechenella verneuili; Ceratarges armatus; Cyphaspis hydrocephala; Tropidocoryphe barroisi.

Givetian.

Phacops latifrons; Eudechenella verneuili.

Assise de Frasnes.

Asteropyge sp.; *Cyphaspis* sp.

——— Présence du *Tropidocoryphe barroisi* dans le Couvinien supérieure des Environs de Hotton.—Bull. Soc. Belge de Géol., de Palaeont, &c., Vol. 31, 1921, pp. 22-23.

MANSUY, H. Fascicule II, Etude Géologique du Yun-Nan Oriental.—Part 2, Palaeontologie, 1912.

Cambrian.

Ostracoda:

Bradoria douvillei sp. nov., p. 22, pl. 1, fig. 3; *Aluta?*, p. 22, pl. 4, fig. 7; *N. orthozoe?* p. 23, pl. 4, fig. 8.

Trilobita:

Redlichia chinensis Walcott, p. 24, pl. 1, fig. 10a, b; pl. 2, fig. la-j; pl. 3, fig. la, b; *R. nobilis* Walcott, p. 26, pl. 3, fig. 2; *R. walcotti* sp. nov., p. 26, pl. 3, fig. 4a-h; *R. carinata* sp. nov., p. 27, pl. 3, fig. 5a-f; R. sp.-p. 27, pl. 4, fig. 5.

Palaeolenus gen. nov., p. 27.

The genus is allied to *Olenus* by the general form, by the direction of the facial sutures, and by the number of thoracic segments; but it is separated by the rectangular form of the glabella and its dilated from in front.

Bathyuriscus armatus Walcott has a similar glabella.

Palaeolenus douvillei sp. nov., genotype, p. 29, pl. 3, fig. 6a-d; pl. 4, fig. la-d; *P. lantenoisi* sp. nov., p. 29, pl. 4, fig. 2a-e; *P. deprati* sp. nov., p. 30, pl. 4, fig. la, b.

Ptychoparia yunnanensis sp. nov., p. 31, pl. 4, fig. 4a, b.

Merostoma:

Amiella prisca sp. nov., p. 31, pl. 4, fig. 6.

Silurian.

Malacostraca:

Ceratocaris pierloti sp. nov. p. 36, pl. 6, fig. la, b.

Sinocaris gen. nov., p. 36.

Sinocaris asiatica sp. nov., p. 37, pl. 5, fig. 10a, b, *S. barbagei* sp. nov., p. 37, pl. 5, fig. 11.

Trilobita:

Dionide formosa Barr., p. 37, pl. 6, fig. 2a, b.

Ostracoda:

Cythere sp.? p. 40, pl. 6, fig. 6.

Carboniferous, p. 85.

Proctus ellipticus sp nov., p. 85, pl. 16, fig. 2a-c.

This *Proetus* is characterized by a marked narrowing in the posterior part and by the angulated form of the glabella, narrow in front; in this it approaches slightly certain forms of Dechenella. The Pygidium of the new species has a more *Proetus* form.

——— Résultats de la Mission Géologique et Minière du Yunnan mèridional. Résultats paléontologiques.—Ann. des Mines, Mars, Avril, 1907, p. 155.

Olenellus (*Mesonacis*) *verneaui* sp. nov., from Lou-Fong-Ts'ouen et d'Yi-Léang.

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An incomplete specimen referred to this genus because of its affinities with the American form *O. asaphoides* Emmons.

MARR, J. E. The Lower Palaeozoic Rocks of the Gautley District, (Yorkshire).—Abs. Proc. Geol. Soc., 1912-13, p. 14.—Quart. Jour. Geol. Soc., Vol. 69, 1913, pp. 1-17.

List of Palaeozoic Crustacea, not descriptive.

MATHER, KIRTLEY F. See WILSON, ALICE E.

MCLEARN, F. H. Revision of Some Phacopid Genera.—Ottawa Naturalist, Vol. 22, 1918, pp. 31-36.

In this monograph on the fauna of the Silurian Arisaig series, the author has found it necessary to revise the interpretation of several Phacopid genera, for the definitions now used are not considered to be in accordance with the evolution of the Trilobite family; *Dalmanitina* Reed, *Phacopidella* Reed, and *Phacops* Emmrich, are redefined.

The equivalence of *Acaste* Goldfuss and *Acaste* Salter are interpreted to replace these genera by *Dalmanitina* and, in particular, Salter's use of *Acaste*.

Describes a new variety, *Dalmanitina logani conservatrix*.

Portlockia McCoy is revised and emended, with subgeneric rank, for the ancestors of the Devonian *Phacops*, sensu stricto.

The generic name *Glockeria* Wedekind is found to be untenable.

Phacopina Clarke is not considered to be a true Phacopinid and is placed in the subfamily Dalmanitinae.

The author used *Galymene stokesii* Milne Edwards for the genotype of the subgenus *Portlockia*, including *Tril. elegans* Sars, *Phacops orestes* Billings, and a new species, *Phacops* (*Portlockia*) *marlandensis*.

The Silurian group of *Phacops stokesii* is ancestral to the group of *Phacops latifrons* from the Devonian, and differs from the latter by having the glabella more depressed anteriorly, so as not to overhang the anterior margin.

——— The Silurian Arisaig Series of Arisaig, Nova Scotia.—Am. Jour. Sci., Vol. 45, 1918, pp. 126-140.

Mentions *Calymene intermedia antigonishensis*, var. nov.

Dalmanitina logani conservatrix var. nov.

This variety described in Ottawa Naturalist, May, 1918, p. 31.

MIQUEL, J. Essai sur le Cambrian de la Montagne Noire.—Bull. Soc. Géol. France, Ser. 4, 1905, pp. 465-483, figs. tin text, pl. XV.

MITCHELL, JOHN. The Carboniferous Trilobites of Australia.—Proc. Linn. Soc. N. S. Wales, Vol. 43, Part 3, Aug. 28, 1918, pp. 437-494, plates 46-53.

The author gives a critical review of the Carboniferous Trilobites of Australia previously described by McCoy, De Koninck, Reed & Etheridge, jr., 1847-1917.

Brachymetopus strzelecki McCoy, 1847.

Phillipsia eichwaldi DeKon., (non Fischer).

Under the name *Griffithides* (*Phillipsia*) *eichwaldi*, de Koninck described a trilobite from Colo Colo, New South Wales.

Mitchell referred it to *G. convexicaudatus*.

Phillippsia dubia Etheridge, Jr. (non *Griffithides dubuis* Etheridge, Sr.), Geol & Pal. Queensland and New Guinea, 1892, p. 214-5, pl. 8, fig. 5; pl. 44, fig. 4, Mitchell (pl. 44, fig. 4.) refers to *Phillipsia rockhamptonensis*, and, (pl. 8, fig. 5,) to *Phillipsia stanvellensis*.

Griffithides dubius Etheridge, Sr., Quart. Jour. Geol. Soc., Vol. 28, 1872, p. 338, pl. 18, fig. 7.

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MITCHELL, JOHN.—Continued.

In the possession of ten or more segments in the thorax it resembles *G. sweeti* and, certainly in this respect, is not a normal *Griffithides* or *Phillipsia*.

Phillipsia grandis Etheridge, jr., Geol. & Pal. Queensland and New Guinea, 1892, p. 215.

Geol. Sur. N. S. Wales, Pal., no. 5, pt. 2, 1892, text fig. 5, pl. 21, fig. 5.

Geol. Sur. Queensland, Publication no. 260, pp. 11, 12, pl. 3, fig. 3.

It is unfortunate that Etheridge placed these two forms specifically together. They are quite different and described by Mitchell as *Phillipsia? robusta* sp. nov. (Etheridge's text fig. 5,) and *Phillipsia grandis*, (Etheridge's pl. 21, fig. 5).

The name *"grandis"* is quite appropriate for either of the forms, because their pygidia are larger than those of any other known form of Carboniferous Trilobite.

Phillipsia woodwardi Etheridge, Geol. & Pal. Queensland & New Guinea, 1892, p. 215, pl. 6, fig. 11, 13; pl. 14, figs. 5, 6.

Other *Phillipsia* without a name were described by Etheridge in Mem. Geol. Sur. N. S. Wales, Pal., 1892, from fragments of the pygidia.

Griffithides dubius Etheridge, Sr., Quart. Jour. Geol. Soc., Vol. 28, 1872, p. 38, pl. 18, fig. 7; *Griffithides seminiferus* De Koninck, (non Phillips).

If De Koninck's figures are to be relied upon, which is doubtful, as they do not agree with the text, (in the former the glabella is represented as being conical in outline and, in the latter, it is said to have an anterior width slightly less than its base). Whatever *Phillipsia* (*Griffithides*) *seminifera* De Koninck may have been, it is practically certain that it was not *Griffithides seminiferus*. Mitchell comparies it with *G. collinsi*, especially the pygidium.

Griffithides seminiferus australasica Etheridge, Geol. & Pal. Queensland & New Guinea, 1892, p. 216, pl. 7, fig. 14.

The species possesses supplementary lobes and *G. seminiferous* does not. Mitchell refers the pygidia to *Phillipsia woodwardi*.

Griffithides sweeti Etheridge, Proc. Linn. Soc. N. S. Wales, 1894, p. 528, pl. 39,fig, 3.

Mitchell remarks "It seems to me that a new genus or subgenus will be needed for this trilobite with ten thoracic segments."

The following species are described and illustrated in this work:

Phillipsia collinsi sp. nov.; *P. coulteri* sp. nov.; *P. breviceps* sp. nov.; *P. proxima* sp. nov.; *P.? robusta* sp. nov.; *P.? stroudensis* sp. nov.; *P. superba* sp. nov.; *P.? waterhousei* sp. nov.; *P. elongata* sp. nov.; *P. rockhamptonensis* sp. nov.; *P. stanvellensis* sp. nov.; *P. grandis* Eth. jr.; *P. woodwardi* Eth. jr.; *P. morganensis* sp. nov.; *P. connolli* sp. nov.; *P. rouchelensis* sp. nov.; *P. dungogensis* sp. nov.

Griffithides convexicaudatus sp. nov.; *G. sweeti* Eth. jr.; *G. dubius* Eth. Sr.

Brachymetopus strzeleckii McCoy; *B. dunstani* sp. nov.; *B.* sp. indet.

——— On Two New Trilobites from Bowning.—Proc. Linn. Soc. N. S. Wales, Vol. 44, 1919, Pt. 2, Aug. 27, 1919, pp. 441-449, pl. 15, 16.

Dalmanites (*Hausmannia*) *loomisi* sp. nov. and *D. meridianus* E. & M.

For *Hausmannia meridianus* Etheridge & Mitchell (in part), 1895.

The author remarks "It appears that the generic name *Hausmannia* proposed by Etheridge & Mitchell, (Proc. Linn. Soc. N. S. Wales, Vol. 10, 1895, p. 502.) to take the place of *Dalmanites* Barr., and which had been previously suggested for a subgenus of *Dalmanites* by Hall & Clarke, (Pal. N. Y., Vol. 7, 1888,) has been rejected by pataeontologists, and for this rejection I am willing to admit there is very good reason, if there were no other than that *Dalmanites* has been so long in use and generally accepted."

Phacops crossleii E. & M.; *Ph. serratus* E. & M.

Adastocephalum telectypicum gen. nov. et sp. nov.

This new genus belonging to the family Phacopidae has the following generic characters:

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Glabella subquadrate, mildly rounded in front, sides straight, only gently converging to the neck ring; lateral glabellar furrows and lobes absent.

The outstanding features of this new type are the complete absence of glabellar furrows and lobes, the small convergence of the axial furrows posteriorly, the squat condition of the eyes, and the mild convexity of the cephalon.

MITCHELL, JOHN. See also ETHERIDGE, R.

MOBERG, JOH. CHR. Historical-Stratigraphical Review of the Silurian of Sweden.—Sveriges Geol. Undersökning, Ser. C, No. 229, 1911, pp. 210, Geol. Map.

Chapter 11 gives a general review of the different series.

Series C, Gotlandia.

The Gotlandian of Skäne.

Zones 4-1 Oved-Ramsäda formation.

3. *Colonus beds,* Zone with *Gothograptus nussa* Holm,—Odarslof flags.

2. *Cytograptus* beds, Zones *C. carruthersi,* etc.

1. *Rastrites* beds, Zones *Monograptus runcinatus* Lapw., *Diplograptus coneta* Gein., etc.

The Gotlandian of Gotland, C/2.

9. Hard Limestone, Crinoid Limestone or Stromatopora Limestone.
8. Ostracod Limestone.
7. *Girvanella* Limestone.
6. Oolite.
5. Sandstone.
4. *Girvanella* Marl.
3. *Dayia* Limestone with *D. navicula* Sow.
2. Marl Shales with Limestone bands, containing *Graptolites.*
1. Shales with *Stricklandiana lirata* Sow.

The Gotlandian of Jämtland, C/3.

3. *Rastrites* beds, upper part.
2. Pentamerus Limestone.
1. Quartzite with *Phacops elliptifrons* Esm.

The Gotlandian of Dalarne, C/4.

4. Grind-sandstone.
3. *Bumastus* Limestone, Grey Shale, *Colonus* beds.
2. *Retiolites* beds.
1. *Rastrites* beds.

Series B, Ordovician.

5. *Harpes* Regio.
4. *Trinucleus* Regio.
3. *Chasmops* Regio.
2. *Asaphus* Regio.
1. *Ceratopyge* Regio.

Series A, Cambrian.

3. Upper Cambrian Zones, *Acerocare, Peltura, Eurycare, Parabolina spinulosa* or *Orthis lenticularis* zone; *Olenus* and *Agnostus* Zones.

2. Middle Cambrian Zones, *Forchammeri* beds, *Agnostus laevigatus* and *Centropleura lovéni* Zones; *Paradoxides davidis* Zone; *Tessini* beds; Middle *Tessini* layers and *Conocoryphe exsulans* Zone; *Oelandicus* beds (*Par. oelandicus* Zone).

1. Lower Cambrian, *Holmia kjerulfi* Zone or Fucoid Sandstone; *Schmidtiellus torelli* Zone,—*Mickwitzia* or *Eophyton;* Lower Hardeberga Standstone.

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MORDZIOL, C. Ueber *Agnostus pisiformis*. Centralbl. für Mineral., 1908, pp. 535-540.

MORGAN, J. Mission scientifique en Perse. Part 4, Palaeontologie. Fossiles, par H. Douville, 1904, pp. 187-380, figs., plates 25-50.

MORNINGSTAR, HELEN. Pottsville Fauna of Ohio.—Geol. Sur. of Ohio. Fourth Series, Bulletin 25, 1922.

Crustacea:

Phillipsia sangamonensis Meek & Worthen, 1865, p. 272.

Compares the pygidia with *P. missouriensis* and *P. major*.

The species *P. sangamonensis* has the same number of axial rings (18) with eleven pairs of pleurae on the lateral lobes.

Phillipsia trinucleata Herrick, 1887, p. 274.

Several pygidia from the Sharon ore are here referred to this species, but they differ from Herrick's species in the absence of the minute granules on the surface.

NEBE, BALDUIN. Die Culmfauna von Hagen i. W.; ein Beitrag zur Kenntniss des Westfälischen Untercarbons.—Neues Jahrib. für Min. Geol. and Palaeont. Beilage, Bd. XXXI, 1911, pp. 431-495, plates XII-XVI.

Trilobita:

Phillipsia westphalica sp. nov., p. 474, pl. XII, figs. 1-5; *P.* cf. *eichwaldi* Fischer, p. 476, pl. XII, fig. 6; *P. sp.*, p. 478. All from Producten-Bank, the new species ranging to Grauerkalk.

NOVAK, OTTOMAR, and PERNER, JAROSLAV. Trilobiti Pasna, D-/lv.—Palaeontographica Bohemiae Nr. IX, Prage. 1918, pp. 51, plate 4.

These notes by Novák are published as a Memori to O. Novák in two sections, Polish and German.

The following forms of fossil Crustacea are described and figured:

Agnostus accedens Novák, p. 6, pl. IV, figs. 32, 33; *A. bohemicus* Nov., p. 6, pl. 1, fig. 7; *A. perrugatus* Barr., p. 7; *A. tullbergi* Nov., p. 7.

Aeglina bergeroni Nov., p. 7, pl. IV, figs. 34-37, fig. in text; *A. prisca* Barr., p. 8; *A. speciosa* Corda, p. 8.

Areia barrandei Nov., p. 8, pl. I, fig. 1-3.

Acidaspis buchi Barrande, p. 8.

Barrandia bohemica Nov., p. 9, pl. IV, figs. 23-31, text fig. 2.

Calymene (*Synhomalonotus*) arago Rouault, p. 10, pl. IV. fig. 20-22; *C.* (*Synhomalonotus*) *inopinta* Nov., p. 10, pl. IV, figs. 1-6; *C.* (*Pharostoma*) *pulchra* Barr., p. 12, pl. IV, figs. 17-19.

Cheirurus pater Barr., p. 12.

Dalmania barroisi Nov., p. 12, pl. I, figs. 8-10; *D. atava* Barr., p. 13.

In the environs of Prague *Dalmania atava* is represented by a number of variants from the typical form. It is remarkable that these varieties constitute a series characterized by the progress in the number of facets of the eye.

The varieties pass to *Dalmanites oriens* and Dr. Perner estimates that the difference between the two species is not of sufficient importance to maintain *D. oriens* as a distinct species.

Varieties of *Dalmania atava;*

A. var. *microphthalma*, Nov., p. 14, pl. I, fig. 13; B. var. *intermedio* Nov., p. 14, pl. I, figs. 11, 12, 14, text fig. 3; C. var. *atava* Barr., type, p. 15; D. var. *transiens* Nov., p. 15, pl. I, fig. 15; E. var. *macrophthalma* Nov., p. 15, pl. I, fig. 16.

Dalmanites oriens Barr., p. 16.

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Dicellocephalina bohemica Nov., p. 17, pl. I, figs. 4-6, text figs. a-c. The form approaches *Centropleura dicranura* Ang. in the form of the cephalon.

Dindymene bohemica Barr., p. 20.

Illaenus aratus Nov., p. 20, pl. II, figs. 27, 28; *Ill. parabolinus* Nov., p. 20, pl. II, figs. 1-9; *Ill. sarkaensis* Nov., p. 21, pl. II, figs. 10-14; *Ill. katzeri* Barr., p. 22, pl. III, figs. 19-22.

Placoparia zippei Boeck, p. 22.

Pliomera senilis Barr., p. 23.

Ptychocheilus (Niobe) discretus Barr., p. 23, pl. III, figs. 1, 2.

Megalaspides alienus Barr., p. 24, pl. III, figs. 9-18.

Asaphellus desideratus, Barr., p. 25, Pl. III, figs. 4-8, text fig. 5.

Trinucleus (Cryptolithus) reussi Barr., p. 25.

PAECKELMANN, —. Oberdevon des Bergischen Badens.—Abhandl. Kgl. Preuss. Geol. Landesanst., N. F., 70, 1913.

PERNER, JAROSLAV. See NOVAK, O.

PFEIL, —. Zeitschr. d. Deutsch. Geol. Ges., Vol. 34, 1882, p. 49.

POMPECKJ, J. F. Ueber *Euloma* und *Pharostoma.*—Neues Jahrb. für Min., 1900-1, pp. 135-138.

POST, L. VON. Bibrag. till Kännedomen von *Ceratopyge* Regionens Utbildning inom Falbygden.—Geol. Fören. Stockh. Förhandl., 28, 1906, pp. 465-480, figs. pl. 13.—Sver. Geol. Undersökn. afh., Ser. C, No. 208, 1906, pp. 1-18, figs. plates.

Not descriptive. The author figures the following species:

Niobe obsoleta Linrs., pl. 13, figs. 1, 2; *Harpides rugosus* Sars & Boeck, pl. 15, figs. 3-5; Pygidium of *Ceratopyge,* pl. 15, figs. 6, 7.

PRICE, W. ARMSTRONG. Palaeontology of Nicholas County, West Virginia, p. 786.

Griffithides scitulus Meek.

Described from the casts of two pygidia. Axis with 8-10 rings; lateral lobes with 6 to 7 pairs of pleurae. Kanawha Group, Eagle Shales.

PRUVOST, P. Sur un *Dalmania* du Devonien Inférieure des Pyrénées.—Ann. Soc. Géol. Nord., Vol. 39, 1911, pp. 2-6, pl. 1.

——— Sur la Presence du Genre *Arthropleura* dans le Terrain Houiller du Nord, et du Pas-de-Calais.—Ann. Soc. Géol. Nord., Vol. 12, 1912, pp. 57-64.

——— Découverte de *Leaia* dans le Terrain Houiller du Nord, et du Pas-de-Calais. Observations sur le Genre *Leaia* et ses différentes Espèces.—Ann. Soc. Géol. Nord. Vol. 43, 1920, pp. 254-281, figs. pl. 2.

——— Introduction à l'Etude du Terrain Houiller du Nord et du Pas-de-Calais. La Faune Continentale du Terrain Houiller du Nord de la France.—Mémoires pour servir à l'Explication de la Carte Géologique détaillée de la France, 1919, p. 334.

The author mentions an almost complete specimen found at Levant du Flénu which he referred with doubt to *Euproops (Prestwichia* pro-parte) *danae* Meek & Worthen.

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RAW, P. The Development of *Olenus salteri* Callaway.—Rep. Brit. Assoc. Adv. Sci., Leicester, 1907.

RAYMOND, PERCY E. A New *Ceraurus* from the Chazy.—New York State Mus. Bull. 189, 1916, p. 121, pl. 30, figs. 9-12.

——— The Presence of a Median Eye in Trilobites.—The Same, pp. 127-143, plates 34-36, text figs. 40-42.

——— The Cephalic Suture Lines of *Cryptolithus*.—The Same, pp. 144-148, text figs. 43-46.

——— Note on Parallelism among the Asaphidae.—Trans. Roy. Soc. Canada, Vol. 5, 1912, Section IV.

Add to the reference of this work in Bibliography Palaeozoic Crustacea, 1895-1917, Transactions San Diego Society of Natural History, Vol. III, No. 1, pp. 73-75:

New Genus *Homoglossa*.

For *Ogygia dilatata panderi* Schmidt, as a genotype.

The type has a long glabella with glabellar furrows at the sides, a distinct, but smooth axial lobe on the pygidium, and smooth pleural lobes; evidently not an ogygiocaris.

———The Succession of Faunas at Lévis, P. Q.—Am. Jour. Sci., Vol. 38, 1914, pp. 523-530.

Divides the fauna into zones A to D.

Places *Arionellus subclavatus* Billings and *Caryocaris curvatus* Gurley in Zone C/1; *Isotelus* sp. in Zone C/2; *Agnostus orion* Bill., *A. sidenbladki* Linrs., *Shumardia granulosa* Bill., *S. pusilla* Sars, *S.* sp., *Endymionia meeki* Bill., *Holometopus angelini* Bill., *Triarthrus* sp. indet., and an Ostracod in Zone D/1.

——— The Pygidium of the Trilobite.—Geol. Mag., Vol. 57, 1920, p. 22.

The author remarks that the development of the pygidium in Trilobites, both as to morphology and ontogeny, shows that the large pygidium is primitive and the small one specialized.

——— On some new Ordovician Trilobites.—Bull. Mus. Comp. Zool., Vol. 64, No. 2, 1920, pp. 273-296.

Dr. Raymond proposes six new genera and describes the following species:

Cryptolithus acervulosus sp. nov. (Described under *Trinucleus*).

Dionideidae, fam. nov.; *Dionide holdoni* sp. nov.

This species is more like *D. richardsoni* Reed than any other. It has fewer rings and ribs on the pygidium, a wider cephalon and narrower axial lobe. The ornamentation separates it from all other species.

Dionide contrita sp. nov.

Raphorus powelli sp. nov.

Endymionidae fam. nov.; *Endymionia meeki* Bill.; *E. schucherti* sp. nov.

Anisonotus glacialis gen. nov.; *A. horneii* (N. & E.); *A. obtusus* M. & S.

Cephalon irregularly convex; glabella small, with lateral furrows indicated by pits; axial lobes of thorax narrow; thorax 7 segments. Pygidium semicircular, but having a somewhat triangular appearance, as in the pygidia of *Cryptolithus* and *Ampyx*, with an axis of 9 rings; sides with 9 pairs of furrows and flat ribs.

Triarthrus caecigenus sp. nov.

Robergia major sp. nov.

This species is exceedingly abundant in the Athens of Saltvile, Va. It differs but little from R. *schlotheimi*.

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Styginidae fam. nov.; *Stygina latifrons* (Portl.)

Bronteopsis gregaria sp. nov.

Nileoides gen. nov.; *Nileus perkinsi* Raymond.

Hybospis shuleri gen. nov. et sp. nov.

The name is proposed for a curious trilobite in the pygidium of which are combined the elongate form of the Asaphid and the short axial lobe of the Illaenid.

Homotelus gen. nov.

The *Onchometopus* of Raymond and Narraway, not Schmidt.

The cephala of American and Russian forms are exceedingly alike in the smoothness of the glabella, position of the eyes, course of the facial sutures and shape of the fixed and free cheeks. Doublures are strikingly different, not only in the hooked and furrowed character of the Russian forms, but also in its narrowness. Greater differences are seen in the thorax where *Onchometopus* shows the high narrow rings of an *Asaphus*, while *Homotelus* has the broader and flattened rings of *Isotelus*. The pygidia are similar.

Homotelus ulrichi sp. nov., genotype; *H. elongatus* sp. nov.; *H. indentus* sp. nov.; *H. laevis* sp. nov.; *H. laeviurus* sp. nov.; *H.* catactus sp. nov.; *H. gratiosus* sp. nov., the *Asaphus* (*Isotelus*) *susae* Whiteaves, not Whitfield.

Vogdesia gigas sp. nov.

The author remarks on this genus: Although proposed as a subgenus of *Nileus*, *Vogdesia* proves to be one of the Asaphinae, and closely related to *Homotelus* and *Brachyaspis*. This conclusion has been reached from a study of the dorsal surface, as the hypostoma has not been seen. *Vogdesia* differs from both of the genera mentioned in having a wider axial lobe in the thorax, and little or no trace of dorsal furrows on the pygidium.

Referred to the genus:

Vogdesia bearsi Raym., genotype; *V. minnesotensis* (Foerste) and *Nileus* sp. Foerste from the renTton; *V. vigilans* (Meek & Worthen), Maquoketa group.

Ectenaspis gen. nov., genotype *Megalaspis beckeri* (Slocum); *E. Homalonotoides* (Walcott).

Isotelus rejuvenis sp. nov.

Ectenonotus gen. nov.; *E. westoni* (Billings); *E. octocostatus* (Reed).

———Phylogeny of the Arthropoda, with Especial Reference to the Trilobites.—Am. Naturalist, Vol. 54, 1920.

Summary:—It would appear that the Trilobites, particularly in respect to their appendages, are more primitive than any other Arthropoda. The chief modifications in other groups are in the nature of reduction, in the loss of whole appendages, of branches or of segments. Extra segments are sometimes added to certain appendages, and new outgrowths, epipodites, are common among the Crustacea.

The Trilobites have what seems, at first sight, a peculiar and specialized dorsal test, but now that it has been shown that the pleural lobes may be lost and the pygidium reduced to a single segment, and, chiefly, that the wormlike form is not primitive, but secondary, they may be viewed in an entirely new light, &c.

———A Contribution to the Description of the Fauna of the Trenton Group.—Canada Dept. of Mines Geol. Sur., Mus. Bulletin, No. 31, 1921, pp. 42, plates 11.

The following Trilobites are described and figured:

Eoharpes ottawaensis (Bill.); *E. dentoni* (Bill.)

Remopleurides striatulus Walc.

Bathyurus ingalli Raym.

Hemiarges paulianus (Clarke).

Encrinurus cybeleformis sp. nov.

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RAYMOND, PERCY E.—Continued.

Cybele spicata sp. nov.
Ceraurus dentatus Raym. & Barton.
Ceraurinus marginatus Barton.
Calymene sp. indet..; *C. senaria* Conrad.
Pterygometopus achates (Billings).

———The Appendages, Anatomy and Relationship of Trilobites.—Mem. Conn. Acad. of Arts & Sci., Vol. 7, 1920, pp. 169, plates 11, figs. in text 46.

Part 1. The appendages and description, with illustration of *Neolenus serratus* Rominger; *Nathorstia transitans* Walc.; *Isotelus latus* Raym.; *I. maximus* Locke; *I. gigas* De Kay; *I. arenicola* Raym.; *Triarthrus becki* Green; *Ptychoparia striata* (Emm.); *P. cordillerae* (Rominger); *P. permulta* Walc.; *Kootenia dawsoni* Walc.; *Calymene senaria* Conr.; *Ceraurus pleurexanthemus* Green; *Acidaspis trentonensis* Hall; *Cryptolithus tessellatus* Green.

Part 2. Structure and Habits of Trilobites.

Internal organs and muscles.

Alimentary canal:—*Ceraurus pleurexanthemus, Calymene senaria* Conrad, *Cryptolithus goldfussi.*

Gastric glands.

Heart:—*Illaenus, Ceraurus* and *Calymene.*

Nervous system, various glands, Panderian organs, eyes, sex, eggs.

Part 3. Relationship of the Trilobites to other Arthropoda.

Branchiopa.

Burgessia bella, Waptia fieldensis, Yohoia tenuis, Opabina regalis.

Copepoda, Archiopepoda, Ostracoda, Cirripedia, Malacostraca, Phyllocardia, Syncarida, Isopoda.

Marrella splendens restored.

Arachnida; Trilobites not Arachnida.

Merostomata.

Sidneyia inexpectans; Emeraldella brocki; Molaria and *Habelia.*

Primitive characteristics of Trilobites; limbs of Trilobites; number of segments in the trunk; form of the simplest protaspis; origin of the pygidium, &c.

———Criteria for Species; Phylogenies and Fauna of Trilobites.—Bull. Geo. Soc. of America, Vol. 52, 1921, pp. 349-352.

Characteristics of the body.

The division transversely into cephalon, thorax and pygidium is subject to much more variation, and the relative lengths of the three portions are frequently used in separating species.

Characteristics of the cephalon.

Of great value in classification. Since the time of Salter and Barrande the major characteristics used in classification have been those of the cephalon, but it remained for Beecher to show the value of the facial sutures and so put in logical order the families already in use.

Characteristics of the ventral side and pygidium.

The ventral side of the body has never, so far, been used in discriminating species.

The extent and form of the doublure has in a few cases afforded generic distinctions.

The shape of the epistoma is, in many cases, of family value, and the hypostoma often enables one to recognize the genus or, if not that, a family.

The pygidium is more used in making specific distinctions than any other part of the body.

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In smooth Trilobites the proportion of length to breadth is almost always constant in small groups. Correlated with this is the number of segments, which is seldom fixed and may, or may not be of specific value.

The rings of the axis represent the true number of segments in the shield, and there are usually less ribs on the pleural than rings on the axial lobe. The number of ribs, their length, prominence, furrows, and ornamentation is of specific value.

The width of the border, the spines on the margin, &c., may be of generic importance.

———The *Ceratopyge* Fauna in Western North America.—Am. Jour. Sci., Ser. 5, Vol. 5, 1921, pp. 204-210.

In the Eureka District, Nevada, the faunas of the lower part of the Pogonip are but imperfectly known, yet there is evidence of the *Ceratopyge* zone in the appearance of *Symphysurus eurekensis, Apatokephalus finalis, Ceratopyge goldfussi,* and *Hemigyraspis caribouensis.* Raymond remarks that *Ptychoparia* (*Euloma*) *affinis* is, however, probably not an Euloma.

In Utah, in the House Range, the highest formation of the Upper Cambrian is named the Notch Peak. No fossils were found in place, but a drift boulder, supposed to have derived from strata in the upper 640 feet, contains *Agraulos sp., Solenopleura ? sp.* and *Tsinania cleora* Walcott. Raymond referred the last named species to *Symphysurus.* The type of *Tsinania,* a Chinese species, has a cranidium similar to that of *Symphysurus,* but more nearly hemispherical, and a pygidium which is nearly as long as wide. This latter feature is the most distinguishing one for the genus and is not shared by any American form.

In British Columbia, two miles west of Donald Station, Prof. Daly found two trilobites, *Dikelocephalus? dalyi* and *Tsinania elongata.* The latter is a *Symphysurus.* This faunule is of the *Ceratopyge* zone. From a lower portion of it, ten miles southeast of Leanchiol, Walcott describes a new species, *Ceratopyge canadensis,* with doubtful reference to this genus. The Canadian form has no glabellar furrows and differs in the course of the facial sutures.

Raymond, in a footnote, describes a new species, *Megalaspis shepardi,* known only from the pygidium, which is elongate in form, subtriangular, pointed behind; axis not prominent, contracted near the middle, with about six joints; pleurae nearly smooth, with one pair of obscure ribs; shell strongly punctate.

Symphysurus, a characteristic fossil of the *Ceratopyge* fauna, with the Brachiopods *Syntrophia nundina* and *Eoorthis desmopleura,* would seem to show that the *Ceratopyge* fauna occupies a position at the base of the Ordovician, from Robson Peak in Canada, southward to the Eureka District in Nevada, on the Western side of the Rocky Mountains.

———A Trilobite Retaining Color Markings.—Am. Jour. Sci., Fifth Series, Vol. 4, 1922, pp. 461-464, Fig. in text.

Anomocare vittata sp. nov.

The author describes and figures a pygidium of *Anomocare vittata* from the Cambrian of Cherokee County, Alabama, which exhibited not very conspicuous banding. The surface is covered with transverse stripes of light and dark gray, the latter almost black. At the anterior margin is a narrow, light band, followed by the broadest one of all, quite dark in tone. The two remaining pairs of dark bands are much narrower, the last almost in line with a continuation of the dorsal furrows. The first two pairs cross the axial lobe, but as all turn backward, they have a somewhat radial effect. In addition to the bands there are very small, irregularly placed spots of a yellowish hue.

REED, F. R. COWPER. The Structure of *Turrilepas peachi* and its Allies.—Trans. Roy. Soc. Edinburgh, Vol. XLVI, Part 3, No. 21, 1908, one plate.

Turrilepas peachi, p. 519, pl. 1.

The author figures one nearly complete individual, pl. 1, fig. 1,

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REED, F. R. COWPER.—Continued.

Starfish bed, with plates in position, and it closely resembles the form described and figured by Barrande as *Plumulites folliculum* from Stage D/d2.

The general structure of the fossil casts doubt on the view that *Plumulites* Barrande and *Turrilepas* Woodward (type *T. wrighti*) are synonymous.

———The Devonian Faunas of the Northern Shan States.—Palaeontologia Indica, New Series, Vol. 2, Memoir, No. 5, 1908, plates I-XX.

Crustacea:

Phacops latifrons (Bronn), var., p. 132, pl. XVII, figs. 15-25.

The author follows Kayser's limiting of the species to Bronn's large form with a non-protruding glabella, which occurs in the *Stringocephalus* Limestone, and separates off the smaller, widely distributed Devonian form with a projecting glabella, as *P. schlotheimi* (Bronn), in accordance with Bronn's original descriptions.

Asteropyge.

Dr. Reed, under the subgenus *Dalmanites* Barrande, 1852, placed, under a section of the genus, Corda's *Asteropyge* to replace the preoccupied term *Cryphaeus* Green, 1837, used Klug in 1833 for a genus of Coleoptera.

The author states that the separation of *D. stellifer* from *D. arachnoides* as the type of a distinct genus, named by Corda *Metacanthus,* is artificial, being based merely on the presence or absence of a terminal median spine to the pygidium.

Kayser, Die Fauna Dev., Ablag. Harzez, Bd. 2, Heft 4, 1878, p. 33, attached specific importance to this feature and even, on the strength of it, would revive Corda's dual division of *Asteropyge* and *Metacanthus.*

Phacops (*Dalmanites*) cf. *Stellifer* Burm., p. 136, pl. XVII, figs. 26, 26a; *Ph.* (*Dalmanites*) *punctatus* (Steininger), p. 137, pl. XVII, figs. 22, 28.

Phaetonides aff. cyclurus Hall, p. 177, pl. XX, fig. 20.

The generic position of this trilobite seems to be in *Phaetonides,* rather than in *Brachymetopus,* although such species as *B. strzeleckii* and *B. woodwardi* bear a considerable resemblance in the shape of the cheek.

Phyllocarida:

Echinocaris asiatica sp. nov., p. 179, pl. XX, figs. 21-25.

The species bears a considerable resemblance to *E. punctata* Hall, but the ornamentation of the test, and the tuberculation of the longitudinal ridge are different from the Wetwin form.

———Pre-Carboniferous Life Provinces.—Rec. Geol. Sur. of India, Vol. XL. Part 1, 1910.

Paper on the problems of the geographical distributions of life in the Palaeozoic seas.

———Devonian Fossils from Chitral, Persia, Afghanistan, and the Himalayas.—Rec. Geol. Sur. of India, Vol. XLI, Part 2, 1911.

Crustacea:

Proetus chilralenis sp. nov., p. 38, pl. 7, fig. 1-6, from Chitral.

The species is allied to *P. bohemicus* Corda, but differs by the posterior half of the pleurae of the pygidium being more swollen, and by the border of the cephalon being concentrically striated above, as well as laterally and below, &c.

———Silurian Fossils from Kashmir.—Rec. Geol. Sur. of India, Vol. XLII, Part 1, 1912.

Crustacea:

Acidaspis kashmirica sp. nov., p. 18, pl. 9, fig. 1-3.

The pygidium has a great resemblance to *A. deflexa* Lake, particularly in the development of the marginal spines, but the tubercles at their bases sufficiently mark off the Kashmir species.

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Calymene cf. *blumenbachii* Brong., p. 20, pl. 9, figs. 4, 5.
Illaenus aff. macallumi Salter.
Encrinurus cf.*punctatus*, p. 22.

———Carboniferous Fossils from Siam.—Geol. Mag., Vol. LVII, 1920, pp. 113-178, pl. 2.

Proetus cf. *coddonensis* Woodward, p. 174, pl. 2, fig. 17.
Phillipsia aff. silesiaca Scupin, p. 175, pl. 2, fig. 18.

———Lower Palaeozoic Fossils, Shan States.—Pal. India, Ser. Nov., Vol. 2, No. 3, 1906, pp. 154, Plates 8.

———Himalayan Fossils; Ordovician and Silurian Fossils from the Central Himalayas.—Mem. Geol. Sur. India, Palaeontologia Indica, Ser. XV, Vol. 7, Mem. No. 2, 1912.

Crustacea:
Asaphus emodi Salter.
The author remarks that if the pygidium is taken in conjunction with any of the associated cephala and pleurae, it can scarcely be doubted that it may be referred to etiher the genus *Asaphus* or *Ptychopyge*.
Asaphus emodi milanensis var. nov.; *Asaphus sp.;* three sp. indet.
Illaenus brachyoniscus Salter; *Ill. punctulosus* Salter; *Ill. spitiensis* sp. nov.; *Illaenus sp.*
Bronteus aff. *lunatus* Billings.
Lichas (*Amphilichas*) *tibetanus* Salter; *Lichas sp.*
Calymene nivalis S. & B.
Sphaerexochus idiotes Salter.
Cheirurus mitis Salter, *Ch. sp. Ch.* (*Cyrtometopus*) *sp.*
Pliomera cf. *insangensis* Reed.
Prosopiscus minus Salter.
Ostracoda:
Eurychilina monticuloides sp. nov.
Krausella shianensis sp. nov.
Primitia everesti sp. nov.
Primitia gerardi sp. nov.
Leperditella? himalaica sp. nov.
Crustacea.
Lankpya lekhi Pass.
Encrinurus aff. *punctatus* Brünnich.
Calymene sp.?

———The Lower Palaeozoic Trilobites of Girvan. Supplement.—Palaeontological Society, 1913, London, Feb. 1914, pp. 56, plates 8.

Trinucleidae:
Trinucleus albidus sp. nov., p. 3, pl. 1, fig. 1, 2.
Ampyx macconochei E. & N.
Dionide richardsoni Reed, p. 5, pl. 1, fig. 7.
Harpedidae:
Harpes (*Eoharpes*) *youngi* sp. nov., p. 6, pl. 1, fig. 4-6; *H.* (*Eoharpes*) *flannagani* Portl. p. 9, pl. 1, fig. 7-9; *H.* (*Eoharpes*) *hornei* sp. nov., p. 10, pl. 2, fig. 1, 2.
Olenidae:
Remopleurides nicholsoni sp. nov., p. 12, pl. 2, fig, 3.9; *R. correctus* Reed, p. 15, pl. 2, fig. 10.

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REED, F. R. COWPER.—Continued.

The author remarks that there seems to be more than a superficial resemblance between the genus *Remopleurides* and *Apatokephalus*, the presence of the pre-glabellar area on the cephalon of the latter, and absence of deflection in the tongue of the glabella seeming to be the principal points of distinction. The glabella, eyes and free cheeks of such a species as *Apatokephalus pecten* Wiman show many features of similarity to *R. correctus, R. barrandei, R. bicornis* and other species.

There seems to be reason to believe that the pre-glabellar area has only been much reduced in *Remopleurides*. The peculiar position of the genal spine in *A. pecten* is identical with that of *R. bicornis*. If we compare *A. serratus* (Boeck) and *S. schlotheimi* (Billings) with the above-mentioned species of *Remopleurides*, we shall see further points of resemblance; and even when we look at the pygidium we can see how, in the reduced number of axial segments in *A. pecten* and in the presence of only three pairs of pleural points, a greater approach is made to the condition in *R. colbyi, R. laterispinifer* and other species.

Telephus salteri sp. nov., p. 16, pl. 2, fig. 11.

Asaphidae:

Asaphus (*Isotelus*) *grayae* sp. nov., p. 16, pl. 3, fig. 1-6.

Stygina latifrons Portl., p. 18, pl. 3, fig. 7.

Cyclopyge bumasti sp. nov., p. 19, pl. 3, fig. 8; *C. subarmata* sp. nov.., p. 20, pl. 3, fig. 9-12.

Bohemilla scotica sp. nov., p. 22, pl. 4, fig. 1.

Illaenus latus McCoy, p. 23; *Ill. peachi* sp. nov., p. 24, fig. 2, 3; *Ill. portlocki* Salter, p. 25; *Ill. richardsoni*, p. 25, pl. 4, fig. 4, 5.

Bronteidae:

Bronteopsis scotica Salter, p. 26, pl. 4, fig. 6.

Proetidae:

Cyphaspis jamesoni sp. nov., p. 27, pl. 4, fig. 8.

Lichadidae:

Lichas (*Corydocephalus*) *maccullochi* sp. nov., p. 28, pl. 4, fig. 9, 10; *L.* (*Amphilichas*) *ardmillanensis* sp. nov., p. 29, pl. 5, fig. 1; *L.* (*Amphilichas*) *hibernicus Port.*, p. 30, pl. 5, fig. 2.

Acidaspidae:

Acidaspis asteroidea sp. nov., p. 31, pl. 5, fig. 3-7; *A. girvanesis* sp. nov., p. 33, pl. 5, fig. 8-10; pl. 6, fig. 1-3; *A playfairi* sp. nov., p. 35, pl. 6, fig. 4-6; *A. terribilis* sp. nov., p. 36, pl. 6 fig. 7-10.

Encrinuridae:

Encrinurus contentus sp. nov., p. 39, pl. 6, fig. 11, 12. *E. multisegmentatus trispinosus* var. nov., p. 39, pl. 7, fig. 1-3.

Cybele lovéni girvanensis Reed, p. 40, pl. 7, fig. 4, 5; *C. bellatula balclatchiensis* var. nov., p. 41, pl. 7, fig. 6; *C. michelli* sp. nov., p. 42, pl. 7, fig. 7.

Dindymene cordai Eth., jr., & Nicholson, p. 44, pl. 7, fig. 8, 9.

Cheiruridae:

Cheirurus keisleyensis Reed, p. 45, pl. 8, fig. 1; *C. octolobatus* McCoy, p. 46.

Sphaerexochus mirus Beyr., *balclatchiensis* var. nov., p. 47, pl. 8, fig. 2.

Staurocephalus globiceps (Port.) p. 48, pl. 8, fig. 3.

Phacopidae:

Phacops (*Chasmops*) *bisseti* Reed, p. 48, pl. 8, fig. 4; *P.* (*Pteryometopus*) *retardatus* sp. nov., p. 49, pl. 8, fig. 5-7; *P.* (*Pterygometopus*) *hunteri* sp. nov., p. 52, pl. 8, fig. 8, 9; *P.* (*Dalmanitina?*) *asterovideus* sp. nov., p. 53, pl. 8, fig. 10.12.

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———The Genus *Homalonotus*.—Geol. Mag., Decade VI, Vol. 5, 1918, pp. 263-276 & 314-327.

The species of *Homalonotus* are grouped together into ten sections or subgenera on the strength of the character and course of the facial sutures, the development of the epistome and doublure, the degree of trilobation of the thorax, and the shape, trilobation, and segmentation of the pygidium.

These characters are variously combined, but on the whole, two large divisions may be recognized, so far as the pygidial characters alone are concerned, one of which is marked by rounded and the other by pointed pygidia.

In the Ordovician genera the pygidia are short, rounded, and composed of few segments, and the trilobation is well marked. In the Silurian and most of the Devonian species the pointed, elongated pygidium, composed of many segments, with or without distinct trilobation, is found conspicuously developed. In the Devonian some of the species with rounded pygidia again prevail, but there is a larger number of segments, and the trilobation is more or less lost.

Ordovician Subgenera:

1. *Echomalonotus* Reed, (for *Brongniartia* pars Salter, not Leach or Eaton).

Cephalon transverse, rounded, more or less semicircular. Facial sutures uniting close to the anterior margin, or on the margin in a regular, wide curve, and posterior branch cutting lateral margins slightly in front of genal angles.

Pre-glabellar area wide, presutural band very narrow or wanting. Thorax with well marked trilobation; axis not wider than the pleural portions.

Pygidium short, broad, expanded, composed of few segments, 6-8; axis distinct; plurae continued to edge or nearly to it; doublure vertical or steeply inclined at sides, simple, of nearly uniform width all round or narrowing slightly posteriorly.

Genotype *H. brongniarti* (Desl.). Range: Lower Ordovician. Distribution: Northern France, Cornwall, Shropshire, Bohemia, thirteen species.

There is a close connection between *Echomalonotus* and *Synhomalonotus* through which the genus is related to *Calymene*.

Ordovician:

2. *Calymenella* Bergeron: Genotype *C. boisseli* (Bergeron).

Cephalon triangular, produced in front into a rostrum; facial sutures uniting in front in regular continuous curve at base of rostrum and inside margin.

Pygidium semicircular, transverse, composed of few segments, distinctly trilobed; axis and pleurae well marked.

Distribution: France, two species.

Middle and Upper Ordovician.

3. *Brongniartella* Reed, (*Brongniartia* pars Salter): Genotype *Homalonotus bisulcatus* Salter.

Cephalon rounded, semielliptical or semicircular, wider than long; facial sutures uniting close to the anterior margin, or on the margin, in a regular, wide curve, the posterior branches cutting the lateral margins nearly at the genal angles.

Glabella urceolate, rhomboidal, or subconical, generally lobeless. Pre-glagellar area of moderate width, presutural band very narrow or wanting.

Thorax with trilobation more or less indistinct; axis wider than plural portions.

Pygidium rounded, semioval or parabolic, composed of 9-12 segments; axis distinct, pleurae continued nearly to margin, border usually developed, but not defined.

Doublure flat, horizontal, closely infolded, of nearly uniform width.

Distribution: England, five species.

Silurian.

4. *Trimerus* Green: Genotype *H. delphinocephalus* Green.

Cephalon triangular and elongated; facial sutures uniting anteriorly close to, but inside, margin in a more or less pointed arch, not forming a

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REED, F. R. COWPER.—Continued.

regular curve, the posterior branches cutting the genal angles; pre-glabellar area well developed; glabella subconical, occasionally lobed.

Thorax, thirteen segments, with very broad axis and indistinct trilobation.

Pygidium composed of many segments, triangular, elongated, subcylindrical, ending in a produced acumination; trilobation faint; doublure very narrow at sides, widening at tip.

Distribution: Northern Europe, North America, Australia, four species.

Silurian.

5. *Koenigia* Salter: Genotype *H. knighti* Koenig.

Cephalon transverse, broad, short; epistome projecting in front as median process; anterior lateral angles of cephalon angulated forward, the three together making the margin tricuspid; facial sutures bending suddenly inward near the anterior margin and uniting in a straight or concave, transverse commissure with small median point; posterior branches of facial sutures bending back suddenly to cut the lateral margins nearly at the genal angles; pre-glabellar area very narrow.

Thorax trilobation almost obsolete; axis very broad, scarcely defined.

Pygidium composed of many segments, elongated, acuminate, triangular, with smooth, pointed posterior process; axis nearly obsolete, but segmentation of axis and pleurae distinct; doublure widening posteriorly.

Distribution: Northern Europe, two species.

A highly specialized subgenus. It is doubtful if *H. johannis* can be closely associated with it, in spite of its tricuspid front, as the pre-glabellar portion is different.

Lower Devonian.

6. *Burmeisteria* Salter (sens. rest.); Genotype *H. herschelii* (Murchison).

Cephalon triangular; facial sutures convergent anteriorly, uniting by a double sigmoidal commissure close to front margin, and posteriorly cutting lateral margins in front of genal angles.

Pre-glabellar area well developed; paraglabellar area distinct; glabella occasionally lobed; epistome projecting in front of anterior margin of cephalon as median pointed process; presutural area very narrow.

Thorax with wide, ill-defined axis; trilobation indistinct.

Pygidium triangular, acuminate, strongly convex from side to side, composed of many segments; axis and pleurae more or less distinct.

Test of cephalon, thorax and pygidium frequently ornamented with more or less regularly disposed, large tubercles or spines.

Distribution: Southern Hemisphere, Africa and South America, nine species.

Lower Devonian.

7. *Digonus* Gürich: Genotype *H. gigas* Roemer.

Cephalon transverse or subtriangular; cranidium with anterior lateral angles rectangular, obtuse, or projecting, and with the anterior margin truncate, straight, or slightly concave; facial sutures bent in abruptly near front margin, and uniting in a continuous, transverse commissure; pre-glabellar area well developed; glabella short, subquadrate or oblong.

Thorax with trilobation usually distinct and well marked.

Pygidium triangular, elongate, acuminate, more or less pointed behind, composed of many segments; trilobation generally well marked. Test of whole body occasionally scabrous or tuberculated but not spinose.

Distribution: France(?), Rhenish Area, England(?), Argentina, seven species.

Lower Devonian.

8. *Burmeisterella* Reed: Genotype *H. elongatus* Salter.

Cephalon subtriangular, produced anteriorly into upturned prora, formed by the epistome and bounded by the epistomal sutures; presutural area large;

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facial sutures bent in abruptly in front and uniting by a transverse commissure close to the anterior end of the glabella; pre-glabellar area narrow.

Thorax with well defined cylindrical axis of less width than pleural portions; trilobation distinct.

Pygidium semioval, rounded, with regular entire margin, in one species provided with a pair of short, terminal spines. (Reed desscribed this species, *B. bifurcata* sp. nov., in Geol. Mag., 1920, p. 303, fig. in text.).

Axis narrow, elongated, distinct, composed of many segments; pleurae distinct; test of glabella, thorax and pygidial axis ornamented with regularly disposed pairs of large tubercles or spines.

Distribution: Devonshire, Rhenish Area, five species.

Lower Devonian.

9. *Parahomalonotus* Reed: Genotype *H. gervillei* Drever.

Cephalon semicircular, transverse; facial sutures uniting in a regular, wide-arched commissure, close to anterior margin.

Thorax with axis obsolete and trilobation quite lost.

Pygidium rounded, semicircular, or suboval, with entire margin; trilobation more or less indistinct, but segmentation well marked, border not crossed by pleurae; test surface ornamented with coarse tubercles and granules, or smooth.

Distribution: Europe, eight species.

Middle Devonian.

10. *Dipleura* Green: Genotype *H. dekayi* Green.

Cephalon subtriangular, with large presutural prora; facial sutures uniting in front of the glabella by a straight, transverse commissure, but continued directly forward without deviation into the epistomal sutures bounding the prora.

Thorax with faint trilobation.

Pygidium triangular, subconical, obtusely pointed behind, with trilobation obsolete or obsolescent, and segmentation very faintly marked.

Distribution: North America.

Devonian.

Schizopyge Clarke, 1913: Genotype *H. longicaudatus.*

Clarke suggested this name for a pygidium with a series of marginal spinules and long terminal spine.

Clarke (Foss. Dev. do Paraná, 1920, p. 101.) remarks that the Paraná and Turkish pygidia would prove to represent a genus distinct from *Homalonotus* or *Calymene,* but allied to both.

———Ordovician and Silurian Fossils from Yun-nan.—Palaeontologia Indica, New. Ser., Vol. 6, Memoir 3, pp. 55-69, plates 8, 1917.

The following species are described and illustrated:

Harpes aff. spasskii Eichwald.

Remopleurides aff. latus Olin.

Asaphus aff. expansus Linné.

Ogygites yunnanensis sp. nov.

Illaenus cacoides sp. nov.; *Ill. aff. oblongatus* Ang.; *Ill. aff. schmidti* Nieszkokski; *Ill.* cf. *tauricornis* Kutorga; *Ill. aff. punctulosus* Salter.

Nilus armadillo Dalman; *N. sp.*

Bathyurus mansuyi sp. nov.

Lichas (*Metopolichas*) *celorhin* cf. *coniceps* Leucht; *L.* (*Metopolichas*) *aff. verrucosus* Eichd.

Calymene unicornis sp. nov.; *C. sp.*

Pliomera martellii sp. nov.

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REED, F. R. COWPER.—Continued.

————Notes on the Fauna of the Lower Devonian Beds of Torquay, Part 1.—Geol. Mag., Vol. 57, 1920, pp. 299-306, & pp. 341-347, plate IV.

Homalonotus (*Digonus*) *gonipygaeus* Woodward; *H.* (*Burmeisterella*) *bifurcatus*, fig. in text exhibiting the short, bifurcated spinose process on the pygidium; *H.* (*Burmeisterella*) *champernownei* Woodward; *H.* (*Burmeisterella*) *elongatus* Salter; *H.* (*Burmeisterella*) *armatus* Burmeister; *H.* (*Burmeisterella*) sp.; *H.* (*Parahomalonotus*) *whidbornei* sp. nov.

Dalmanites (*Asteropyge*) *laciniatus* (Roemer).

Beyrichia (*Zygobeyrichia*) *devonica* J. & W.

————The Lower Palaeozoic Trilobites of Girvan.—Palaeontographical Soc., 1913, Supplement, pp. 56, pl. 5.

The species described are as follows:

Trinucleus albidus sp. nov., for *Trinucleus* sp. b.

Ampyx macconochiei (E. & N.), for *Trinucleus macconochiei* E. &. N.

Remidopleurides nicholsoni sp. nov., for *R. colbyi.*

Dionide richardsoni Reed.

Harpes (*Eoharpes*) *youngi* sp. nov.; *H.* (*Eoharpes*) *flanagani* Portl.; *H.* *Eoharpes*) *hornei* sp. nov.

Remidopleurus correctus Reed.

Telephus salteri sp. nov.

Asaphus (*Isotelus*) *grayae* sp. nov., for *Asaphus* (*Isotelus*) *gigas.*

Stygina latifrons Portl.

Cyclopyge bumasti sp. nov.; *C. subarmata* sp. nov.

Bohemilla scotica sp. nov., for *Bohemilla* sp.

Illaenus latus McCoy; *Ill. peachi* sp. nov.; *Ill. portlocki* Salter; *Ill. richardsoni* sp. nov.

Bronteopsis scotica Salter; *B. ardmillanensis* Reed.

Cyphaspis jamessoni sp. nov.

Lichas (*Corydocephalus*) *maccullochi* sp. nov.; *L.* (*Amphilichas*) *ardmillanensis* sp. nov.; *L.* (*Amphilichas*) *hibernicus* Portlock.

Acidaspis asteroidea sp. nov.; *A. girvanensis* sp. nov.; *A. playfairi* sp. nov.; *A. terribilis* sp. nov.

Encrinurus contentus sp. nov.; *E. multisegmentatus trispinosus* var. nov.

Cybele lovéni girvanensis Reed; *C. bellatula balclatchiensis* var. nov.; *C. michelli* sp. nov.

Dindymene cordai E. & N.

Cheirurus keisleyensis Reed; *C. octolobatus* McCoy.

Sphaerexochus mirus balclatchiensis var. nov.

Staurocephalus globiceps (Portlock).

Phacops (*Chasmops*) *bisseti* Reed; *P.* (*Pterygometopus*) *retardatus* sp. nov.; *P.* (*Pterygometopus*) *hunteri* sp. nov.; *P.* (*Dalmanites?*) *asteroideus* sp. nov.

————Supplementary Memoir on New Ordovician and Silurian Fossils from the Northern Shan States.—Mem. Geo. Sur. India, Palaeontologia Indica, Vol. 6, Mem. No. 1, 1915.

Crustacea:

Agnostus cf. *glabratus* Ang.

Ampyx rostratus shamensis var. nov.; *A. aff. maccallumi* Salter.

Dionide hybrida sp. nov.

Harpes (*Eoharpes*) *aff. flanagani* Portl.

Remopleurides sp.

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Asaphus cf. *devexus* Eichw.; *A.* cf. *ornatus* Pomp.

Ogygites birmanicus sp. nov.

Ptychopyge thebawi sp. nov.; *P. sp.; P.* (*Basilicus*) *titanica* sp. nov.

Megalaspis aff. hyorhina Leuch.; *M. sp.*

Illaenus liluensis sp. nov.; *Ill.* sp.; *Ill. aff. portlocki* Salter.

Holometopus wimani sp. nov.; *H. orientalis* sp. nov.

Lichas (*Metopolichas*) *aff. verrucosus* Eichw.; *L. sp.*, 1-3.

Calymene birmanica Reed; *C.* (*Pharostoma*) *liluensis* sp. nov.; *C. oldhami* sp. nov.

Cheirurus dravidicus sp. nov.; *C. submitis* sp. nov.

Pliomera (*Encrinurella*) *ingsangensis* Reed.

Encrinurella.

The new subgenus given for this species on the difference in the shape and lobation of the glabella from *Pliomera.*

Glabella large, claviform, or subpyriform, expanding anteriorly to about one and a half times its basal width, swollen, convex, slightly overhanging the anterior margin; three pairs of nodular lateral lobes present, front one large, rounded anteriorly, more than one-third the length of the glabella.

First lateral lobes small, subcircular, nodular, one-fifth the width of glabella; second lateral lobes smaller, nodular, nearly circumstribed internally; third lateral lobes still smaller, nodular, connected by a narrow band across base of glabella; surface of glabella granulated.

Phacops (*Pterygometopus*) *dagon* sp. nov.; *P.* (*Pterygometopus*) *dagon wynnei* var. nov.; *P.* (*Chasmops?*) sp.; *P.* sp. indet.

Ostracoda:

Aparchites? sp.; *Primitia aff. mundula* Jones; *Krausella* sp.

Fossils from the Silurian Beds.

Crustacea.—Fauna of the Namhsim Beds.

Illaenus namhsimensis sp. nov.; *Calymene blumenbachii* Brong., var.; *Phacops* (*Dalmanites*) *longicaudatus orientalis* Reed.

Panghsa-pye Beds, (Trilobite band).

Acidaspis shanensis sp. nov.; *Phacops* (*Dalmanites*) *hastingsi* sp. nov.

Ostracoda:

Bollia alexanderi sp. nov.; *Kloedenella? birmanica* sp. nov.; *Primitiella? orientalis* sp. nov.

REED, F. R. COWPER, & REYNOLDS, S. H. Silurian Fossils from Certain Localities in the Tortworth Inlier.—Proc. Bristol Nat. Sci., Ser. 4, Vol 2, 1908, Part 1.

List of Fossils.

————Fossiliferous Silurian Rocks of the Tortworth Inlier.—Quart. Jour. Geol. Soc., Vol. 44, 1908, pp. 512-545.

List of Fossils.

REED, F. R. COWPER, & GARDINER, G. I. The Silurian Inlier of Usk.—Proc. Cotteswod Nat. F. C., Vol. XIX, Pt. 2, 1916, pp. 129-172, pl. 78.

Crustacea:

Proetus stokesi bellula var. nov., p. 165, pl. 8, fig. 5-11.

The cephalon closely resembles that of specimens usually referred to *Proetus stokesi*, but the original description is scanty, the figure of this species is poor and the genotype specimen is not known.

McCoy's description was unsatisfactory and Lovén was the first to give a full diagnosis of the specific characters with good figures.

The Usk cephalia differ from the Wenlock examples by the relatively shorter and blunter glabella, the stronger development of the first and second glabel-

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REED, F. R. COWPER AND GARDINER, G. I.—Continued.

lar furrows, and larger eyes. The median ridge in the marginal furrow in front of the glabella, which is present in the new variety, and in some specimens from the Wenlock Limestone of Dudley, is not mentioned by McCoy or Lovén, nor is it shown in any of the figures of *P. stokesi*. The species is said by Lovén to have a double elevated line on the cheek, whereas in var. *bellula* the line is single.

Proetus signatus Lindström, p. 168, pl. 8, fig. 12.

Calymene intermedia Lindström, p. 168.

Phacops (Phacopidella) stokesi uskensis var. nov., p. 169, pl. 8, fig. 13-16.

This small form may be regarded as more nearly allied to *P. stokesi* than to *P. elegans* Sars & Boeck. The two much reduced and isolated lateral furrows on the glabella, the long, frontal lobe and strong third lateral furrow recall also *P. misheni*. The division of the first lateral furrow into two parts is always a marked feature in the two first named species, but the greater distinctness of the subcircular composite lateral lobe in the new variety seems to mark it off from typical *P. stokesi*, and to warrant its separation as a definite variety.

RECK, HANS. See STAFF, HANS VON.

REYNOLDS, S. H. See GARDINER, G. I.

REYNOLDS, S. H. See REED, F. R. COWPER.

RICHTER, E. See RITCHER, RUDOLF.

RICHTER, RUDOLF. Von unseren Trilobiten.—Bericht. der Senckenbergischen Nat. Ges. in Frankfort am Main, 1914, pp. 50-62, 22 figures.

Agnostus rex Barr.

Trinucleus ornatus Sternb.

Drepanura premesnilli Berg.

Conocoryphe sulzeri Schlot.

Agnostus pisiformis Linné.

Dalmanites socialis Barr.

Calymene niagarensis Hall; *C. blumenbachii* (Brong.) Salter.

The upper and under side of a Trilobite.

Harpes naummanni Barr.; *H. ungula* Sternb.

Dechenella granulata Richter.

———Die Entstehung der abgeroliten "Daleider Versteinerungen" und das Alter ihrer Mutterschichten.—Jahrb. der Königl. Preuss. Geol. Landesanstalt für 1916, Bd. 37, Heft & pp. 247-259, pl. 25-27.

Cryphaeus rotundifrons Emm.; *C. kochi* Kayser; *C. letheae* Kayser.

Acaste henni Richter; *A. schmidti* Richter.

Cryphaeus anserinus Rud. & E. Richter; *C. drevermanni* Rtchter; *C. stellifer* Burm.; *C. punctatus* Stein.

——— Proetiden aus neueren Aufsammlungen im Vogtländischen und Sudetischen Oberdevon.—Senckenbergiana, Bd. 1, No. 4, 1919, pp. 97-130, 14 figs. in text.

Cyrtosymbole planilimbata sp. nov.; *C.* sp. nov. a; *S. sp.* nov. b. & c.

Drevermannia aff. brocciae Ritcher; *D. sp.* c; *D. ?carnica macilenta* var. nov.

Typhloproetus schidewolfi sp. nov.

Skemmatopyge gen. nov.: Genotype *S. tietzei* sp. nov.

Proetus (Chaunoproetus) subgen. nov.; *Proetus (Chaunoproetus) palensis* Richter, 1913; *Proetus (Chaunoproetus)* ex. *aff. palensis* sp. nov a.

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Heiloproetus subgen. nov.: Genotype *Proetus* (*Heiloproetus*) *ebersdorfensis* Richter; *P.* (*Heiloproetus*) *oblongulus* sp. nov.

Proetidae, subgenera incerta.

Proetus (Subg.?) *gümbeli* Richter, 1913, & var. *abruptirachis; P.* (Subg?) *franconicus* sp. nov.; *P.* (Subg?) *avitus* sp. nov.; *P.* (Subg?) sp. indet.

———Vom Bau und Leben der Trilobiten. 1. Das Schwimmen.—Senckenbergiana, Bd. 1, No. 6, 1919, pp. 32-38, 8 figs. in text.

———Vom Bau und Leben der Trilobiten. 2. Der Aufentenhalt auf dem Boden, Der Schutz, Die Ernährung.—Senckenbergiana, Bd. 2, Heft 1, 1920, pp. 23-43, 12 figs. in text.

———Beiträge zur Kenntniss Devonischer Trilobiten. Dritter Beitrag ueber die Organisation von Harpes, einen Sonderfall unter Crustaceen, 1920.—Senckenbergischen Nat. Ges., Bd. 37, 1917, pp. 179-218, plates.

Harpes macrocephalus Goldfuss.

RICHTER, RUDOLF, & RICHTER, E. Die Lichadiden des Eifler Devons.—Nues Jahrb. für Min., etc., Jahrg., Bd. 1, 1917, pp. 50-72, pl. 5, 6, 12 figs. in text.

Lichas (ex *aff. Plusiarges?*) *beryllifer* Richt.; *Lichas* (*Euarges*) cf. *parvulus* Novák; *Lichas* (*Ceralarges*) *armatus* Goldf.; *Lichas* (*Eifliarges*) *caudimirus* sp. nov. et subg. nov.

Eifliarges subg. nov.; Genotype *Lichas* (*Eifliarges*) *caudimirus.*

Wir errichten für diese affällige und nirgends unterzubringende Form eine neu Untergattung, *Eiflarges,* die in folgender Weise gekennzeichnet werden kann. Kopf nach den Grundplan von *Euarges* gebaut, d. h., vordere Seitenlappen ringsherum scharf umgrenzt, hintere Seiten lappen nach vorn, innen und hinten scharf umgrenzt, nach aussen abermit den Festen Wangen verschmolzen. Nackenläppchen fehlen. Wangenhörner nach vorne gerückt-Schwanz mit Argesgesetz und Rippen (nur aus den wulstigen Hinter bändern der Glieder bestehend), aber aus zahlreichen (8) Gliedern aufgebaut und mit fast ebensovielen (7) enggestellten und über die ganze Flanken fläche gleichmässig verteilten Rippen versehen, die sich in Stacheln fortsetzen-Höhere Lagen des unteren Mitteldevons. Einzige Art. *L.* (*Eifliarges*) *caudimirus* sp. nov.

———Bemerkungen ueber das Schnauzenschild bei Homalonoten.—Centralblatt für Min., etc., Jahrg., 1917, No. 5, pp. 114-120, 3 figs. in text.

Rostral shields of *Homalonotus rhenanus* Kock; *H.* (*Burmeisteria*) *armatus; H. noticus* Clarke.

The Acidaspidae consist of nine genera and six subgenera with about 107 species described from the Ordovician, Silurian and Devonian.

The six subgenera are arranged as follows:

a.—*Acidaspis* (*Pseudomonaspis*) *grayi* Barr.: Genotype.
(*Primaspis*) *primordalis* Barr.: Genotype.

b.—*Odontopleura* (*Leonaspis*) *leonhardi*: Genotype.

c.—*Ceratocephala* (*Miraspis*) *mira* Barr.: Genotype.
(*Radiaspis*)*radiata* Goldf.: Genotype.
(*Ceratocephala*) *goniata* Warder.

The original term *Acidaspis* Murchison, 1839, was founded on a group corresponding to *Odontocephala ovata* Emmons, 1839.

The original and earlier term *Ceratocephala* Warder, 1832, was founded on a group of species like *Acidaspis verneuili* Barr.

The occipital ring exhibits different characteristics:

1.—In *Odontopleura ovata* it has a median tubercle; thorax 9 segments; pleurae ending in double points; pygidium border spined, 3-p-4-p-3. Silurian.

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RICHTER, RUDOLF AND RICHTER, E.—Continued.

2.—Occipital ring with a pair of occipital spines originating on each side, *Ceratocephala goniata,* Silurian. A similar species from Bohemia, *C. verneuili* Barr. has ten thorax segments; pleurae ending in a point; pygidium axis two joints; border with seven pairs of spines.

3.—Occipital ring with a long median spine and median tubercle, *Acidaspis brighti,* Silurian. Thorax not known; pygidium border 2-p-3-3.

4.—Occipital ring with a median tubercle and a pair of lateral spines, like *Odontopleura* and *Ceratocephala,* but the posterior border with six small spines; thorax 10 segments; pleurae ending in double points; pygidium axis two joints, border spined 3-p-5-p-2. *Acidaspis (Primaspis) primordialis* Barr., Ordovician.

5.—*Selenopeltis buchi,* occipital ring entire, without spines, Ordovician. Throax nine segments; pleurae ending in spine and point; pygidium axis two joints; border entire except the first rib extending over the margin. O-p-O-p-O.

6.—*Dicranurus hamata,* occipital ring with two spirally recurved spines; thorax axis very abruptly elevated, semicylindrical, with two lateral tubercles; pleurae extending at right angles to the axis and bent backward into long spines; pygidium border, O-p-O-p-O. Devonian.

7.—*Ancyropyge romingeri,* Devonian, only known from the pygidium, which has twelve long, curved spines, 4-p-4-p-4.

8.—*Glaphurus pustulatus,* Ordovician; occipital ring entire; thorax with eleven segments; pleurae ending in strong spines, each segment bearing on each side of the axis near the dorsal furrow a tubercle with three small spines; axial rings having numerous small spines; pleurae narrow, flat, the first segment ending in a sharp spine, but the succeeding ones rounded at the ends and bearing three nearly horizontal spines; pygidium margin entire; axis with two joints; lateral lobes with 2-4 pairs of ribs; border ornamented with spines running all round.

9.—*Bounyongia bowningensis,* Silurian. Head only known. The genus has a pair of cephalic spines originating on the glabella in front of the occipital ring; this feature is not known in any other genus.

Acidaspidae:

Number of species 125, synonyms 18. Total, 107.

Doubtful reference of fragments, 25.

Acidaspis 107, *Ancyropyge* 1, *Bounyongia* 1, *Ceratopyge* 31, *Dicranurus* 3, *Glaphurus* 2, *Odontopleura* 60, *Selenopeltis* 1, (3 species of *Acidaspis* have been referred to *Trapelocera* Corda).

———Ueber die Einteilung der Familie Acidaspidae und ueber einige ihrer, Devonischen Vertreter. (Vorlänfige Mitteilung)—Centralblatt für Min., &c., Jahrg., 1917, No. 21 & 22, pp. 462-472, 9 figs. in text.

The authors arrange the Acidaspidae under six subgenera.

Acidaspis (Murch.) Barr.

Subgen. *Pseudomonaspis brighti, grayi* & *quinquespinosa.*

Primaspis subg. nov.: *Acidaspis primordialis* Barr.

Odontopleura Emmrich; *O. ovata* Emm.

Leonaspis subg. nov.; *Acidaspis leonhardi* Barr.,*pigra* Barr., ex *aff. harborti* Rich.

Ceratocephala Warder, *C. goniata* Warder.

Miraspis subg. nov.; *Acidaspis mira* Barr.

Radiaspis subg. nov.; *Acidaspis radiata* Goldf.

Ceratocephala goniata & *verneuili* Barr.; *selcana* A. Roem.

Dicranurus Conrad; *D. hamata* Conrad; *D. monstrosa* Barr.

Selenopeltis Corda; *S. buchi* Barr.

Ancyropyge Clarke; *A. romingeri.*

Glaphurus Raymond; *G. primus.*

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———Ueber einzelne Arten von Acidaspis, Lichas, Cheirurus, Aristozoe, Prosocoelus, Terebratula & Spirophyton, aus der Eifel.—Jahrb. des Nassauischen Verelus für Naturk, in Wiesbaden, 70 Jahrg. 1917, pp. 144-161, pl. 1, 6 figs. in text.

Acidaspis (*Pseudomonaspis*) *bucco* sp. nov.
Lichas (*Euarges*) *mephisto* sp. nov.
Cheirurus sternbergi myops Roemer.
Aristozoe porcula sp. nov.

———Von unseren Trilobiten, II.—Bericht der Senckenb. Naturf. Ges., 1918, pp. 123-131, pl. 1-3.

Phacops schlotheimi Bronn.
Proetus cuvieri Stein; *P. chamaeleon* Rud. & E. Richt.; *P. cornutus* Goldf.
Cryphaeus punctatus Stein.
Astycoryphe senckenbergiana Rud. & E. Richt.
Bronteus alutaceus Goldf.
Tropidocoryphe barroisi Maillieux.
Acidaspis (*Leonaspis*) *elliptica* Burm., *A.* (*Radiaspis*) *radiala* Goldf.
Cyphasis ceratcphthalmia Goldf.
Lichas (*Ceratarges*) *armatus* Goldf.

———Neue *Proetus*-Arten aus den Eifler Mitteldevon.—Centralblatt für Min., &c., Jahrg. 1918, No. 3, pp. 64-70, 5 figs. in text.

Proetus (*Euproetus*) *cultrijugati* sp. nov.
Gerastos granulosus ex parte Goldf., 1843, pl. 4, fig. 4a-c.
Proetus (*Euproetus*) *cuvieri granulosus* Goldf.; *P. granulosus* Goldf., 1843, pl. 4, (not fig. 1a-c); *P.* (*Euproetus*) *chameleon* sp. nov.; *P.* (*Euproetus*) *tenuimargo* Richter, syn. *P. cornutus* Beyr., 1846, p. 28, pl. 3, fig. 9, (not Goldfuss); *P.* (*Euproetus*) *dohrni* sp. nov.

———Der Proetiden-Zweig, *Astycoryphe, Tropidocoryphe, Pteroparia.* —Senckenbergiana, Bd. 1, No. 1, & 2, 1919, pp. 1-17 & 25-51, 18 figs. in text.

Astycoryphe gen. nov.: Genotype; *A. senckenbergiana* Rud. & E. Richter; *A. gracilis* (Barr.) (*Proetus gracilis* Barr.); *A. westfalica* sp. nov.; *A. novaki* (Beyer.) (*Tropidocoryphe novaki* Beyer.); *A. brilonensis* sp. nov.; *A. champernownei* Whidborne.

Tropidocoryphe und *Pteroparia.*

Synonyms *Phoeton* Barr., 1846, ex parte, *Prionopeltis,* Group B, Corda, *Proetus* Corda, 1847, ex parte, Barrande, 1852, ex parte, Maillieuz, 1904, ex-parte, *Tropidocoryphe* Novák, 1890, *Tropidocoryphe barroisi* (Maillieux), *Proetus barroisi* (Maillieux). *T. barroisi* (Maillieux) var. a & var. b.

Tropidocoryphe filicostata Novák, 1890; *Proetus* (*Tropidocoryphe*) *filicostatus* (Novak); *T. latens* Barr., (*Proetus latens* Barr.); *T. memnon* (Corda), (*Proinopeltis memon* Corda); *T.? heteroclyta* Barr.; (*Proetus heteroclyta* Barr.).

Pteroparia Richter, 1913; *P. columbella* Richter.

———Ueber *Phacops laevis* Münster und andere Phacopiden des Vogtländischen Oberdevons.—Senckenbergiana, Bd. 1, No. 4, 1919, pp. 131-140.

Phacops laevis Münster, 1842, nov. emend., non *Calymene laevis* Münster, 1840, Beiträge 3, pl. 5, fig. 4, *Trinucleus laevis* Münster, Beiträge 5, pl. 10, fig. 6; *P. caecus* Gürich, 1896; *P. cryptophthalmus* Emm., em. Drevermann, 1901; *P.* sp. a & b and *P.* sp. indet.

Trimerocephalus griffithides sp. nov.; *T.? lotzi* Drevermann, 1901; *T. sp.; T.* aff. *anophthalmus* Frech.

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RICHTER, RUDOLF AND RICHTER, E.—Continued.

————Liste der Trilobiten aus den Geeser und Auburg-Schichter der Gerolsteiner und Prümer Mulde.—Senckenbergiana, Bd. III, Heft 5, 1921.

Goldius alutaceus,—flabellifer,—scaber.

Thysanopeltis acanthopeltis.

Tropidocoryphe barroisi, & vars.

Astycoryphe senckenbergiana.

Proetus (Proetus) chamaeleon,—cuvieri,—dohrni,—tenuimargo.

Proetus (Cornuproetus) cornutus.

Cyphaspis ceratophthalma,—hydrocephala, & sp.

Acidaspis (Pseudomonaspis) bucco; A. (Leonaspis) elliptica,—aries; A (Radiaspis) radiata.

Lichas (Ceratarges) armatus; L. (Eifliarges) caudimirus; L. (Euarges) mephisto.

Cheirurus (Crotalocephalus) sternbergi, mut.*myops.*

Phacops latifrons,—schlotheimi,—& ex *schlotheimi.*

Cyphaspis punctata,—stellifer.

ROWLEY R. R. Description of Fossils.—Contributions to Indiana Palaeontology, Green, Vol. 2, 1906, Part 2, pp. 21-31, Trilobites, plate V.

Phacops cristatus Hall, p. 21, pl. 5, fig. 1, 2, 3, 4, 27, 10, 11; *P. cristatus pipa?* Hall, p. 22, pl. 5, 6; *P. rana,* p. 22, pl. 5, fig. 7-9, 19.

Proetus microgemma Hall, p. 23, pl. 5, fig. 12, 13, 28, 30; *P. crassimarginatus?* Hall, p. 23, pl. 5, fig. 14, 15, 17; *P. sp.,* p. 25, fig. 6, hypostoma; *P. macrocephalus* Hall, p. 24, pl. 5, fig. 18.

Dalmanites selenurus Hall, p. 25, pl. 5, fig. 20; *D.* sp. p. 25, pl. 5, fig. 21, 29.

Triarthrus becki Green, p. 26, pl. 5, fig. 22.

Calymene callicephala Green, p. 26, pl. 5, fig. 23-25; *C. niagarensis* Hall, p. 27, pl. 5, fig. 26.

Phillipsia tuberculata M. & W., p. 27, pl. 5, fig. 31.

The author writes me that one of the figures on the Trilobite plates (*Dalmanites* sp., fig. 21,) is misleading, since it is composed of two distinct pygidia, curiously attached, giving the appearance of a complete specimen with a tail at each end.

RUEDEMANN, RUDOLF. A Recurrent Pittsford (Salina) Fauna.—Bull. N. Y. State Mus., No. 219, p. 220.—Fifteenth Rep. Director, N. Y. State Museum, 1918.

A new genus, *Mixopterus,* and the following Crustacea are described:

Notes on the Fossils of the Vernon shales.

Hexameroceras chadwicki sp. nov.

Mixopterus multispinosus gen. nov. et sp. nov.

The generic term was proposed for forms like *M. multispinosus,* uniting the following characters of *Eusarcus,* viz:—subtriangular carapace, forward, submarginal position of compound eyes, subtriangular form of metastoma, predominant length of second pair of endognathites and decreasing length of the following pairs of endognathites; powerful swimming legs with long blades, short proximal joints, and curved telson spine.

Compared with *Stylonurus (Ctenopterus),* it has a relatively narrow preabdomen, a gradually contracting postabdomen, and a series of longitudinally arranged, vertically attached spines upon the longer endognathites.

A feature "sui generis" in this genus is the "dorsal furrows" upon the preabdomen.

Hughmilleria phelpsae sp. nov.; *Pterygotus? vernonensis* sp. nov.

Bibliography of *Eurypterus.*

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————Palaeontologic Contributions from the N. Y. State Museum. Notes on the habitat of the Eurypterids.—Bull. N. Y. State Mus., 189, 1916, pp. 113-115.

———— The Palaeontology of Arrested Evolution.—Address, President, Palaeont. Soc., Dec. 1916.—Thirteenth Rep. Director N. Y. State Mus., 1916, pp. 107-134.

The Trilobites contain a few persistent genera, viz:

Ordovician—Devonian:—*Goldius, Calymene, Conolichas, Cyphaspis, Hoplolichas.*

Ordovician-Carboniferous:—*Proetus.*

Branchiopoda contain the following:

Devonian-Pleistocene:—*Estheria.*

Ostracoda the following:

Ordovician-Devonian:—*Beyrichia, Primitiella.*

Ordovician-Carboniferous:—*Aechmina, Bollia, Entomis, Leperditia, Ulrichia.*

Ordovician-Permian:—*Primitia.*

Ordovician-Recent:—*Bairdia, Bythocypris, Cypridina, Cytherella, Macrocypris.*

Silurian—Recent:—*Pontocypris.*

Permian-Recent:—*Cythere.*

Cirripedia the following:

Cambrian?-Devonian:—*Turrilepas.*

Ordovician-Devonian:—*Lepidocoleus.*

Merostomata the following:

Ordovician-Devonian:—*Pterygotus.*

Ordovician-Permian:—*Eurypterus.*

————Palaeontological Contributions from the N. Y. State Museum. 3.—On Some Cases of Reversion in Trilobites.—Sixteenth Rep. Director N. Y. State Museum and Sci. Dept., 1921, pp. 70-78, fig. 8-20.

The author remarks on *Triarthrus spinosus* Billings that he has found this characteristic trilobite of the Canadian Gloucester shales among material from the upper Utica shales at Holland Patent, N. Y. These specimens exhibit a series of three successive spines on the axis of the thorax on the eighth, ninth and tenth axial rings, and also on the eleventh to the thirteenth thorax segments. Finally also some of the pleurae of the thorax seem to have been produced at times into long, recurving spines; this is at least suggested by two such spines found, apparently attached to a fragment of a pleura lying partly below a specimen.

The peculiar lateral spine of the free cheek, and the series of long spines on the posterior segments, are characters not seen in Ordovician or later trilobites, but known in certain early Cambrian forms, especially of the family Mesonacidae. Also the long nuchal spine on the occipital ring is very strongly developed in the Mesonacidae, but rarely seen in Ordovician or later trilobites.

Ruedemann quotes Dr. Clarke's remarks on *Proboloides cuspidatus* from the Devonian in regard to the lateral spines on the cheeks.

On page 76 the author gives a list of Cambrian genera having an axial line of spines, such as *Albertella, Zacathoides, Neolenus, Elliptocephala, Mesonacis, Callavia, Holmia, Wanneria, Paedeumias, Bathyuriscus, Dolichometopus, Ogygopsis* and *Asaphiscus.* These genera contain species with rows of long spines or prominent mucros, while in the following Ordovician to Devonian periods this feature becomes suppressed to such an extent that, for example, in Barrande's array of trilobites not a single form with this row of spines is found. Some Devonian trilobites of New York, viz.: *Cryphaeus (Asteropyge) boothi, calliteles, Phacops cristatus* and *Calymene platys* retain faint tubercles on the axial line, and none, not even the highly spinose Acidaspidae, exhibit rows of axial spines.

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RUEDEMANN, RUDOLF.—Continued.

————5.—A New Eurypterid from the Devonian of New York, p. 88.
Pterygotus inexpectans sp. nov., p. 88, fig. 29-32.

————6.—Preservation of an Alimentary Canal in an Eurypterid, p. 92.
Eusarcus newelini Clatpole, p. 92, fig. 33-35.

————7.—Notes on *Caryocaris* Salter.

Caryocaris wrighti, p. 96, fig. 36; *C. curvilatus* Gurley, p. 96, fig. 39-51.

Gurley referred the genus to the Graptolites from its supposed resemblance to *Dawsonia*.

Ruedemann referred it to the Crustacean order and to the Lower Ordovician or Canadian instead of the Cambrian.

————On the Occurence of an *Apus* in the Permian of Oklahoma.—Jour. of Geology, Vol. XXX, 1922, pp. 311-318, 5 figs. in text.

Apus beedei sp. nov., fragments.

Carapace small, broadly eliptic, nearly circular in outline, with a small posterior emargination, shield-like, and sloping from the subcentral apex, abruptly forward, more gently backward. A transverse cervical fold situated about one-fifth of the length of the carapace posterior to the anterior border; immediately posterior to this several large, but slightly curved "shell glands" or excretory organs, beginning at either side of the median line, and extending obliquely backward about half way to the lateral faces of the carapace, reaching to about one-fifth of the length of the carapace from the posterior border. Axial line marked behind the cervical fold by a distinct depression extending about one-third of the distance toward the posterior border.

Permian near Elkeno.

The discovery of this form carried the range of the living genus *Apus* back to Permian. The true *Apus* has only once been found in a fossil state from the Buntsandstein of the Vigesian Mountains; *Apus antiquus* Schimper, in the Triassic.

SALTER, J. W. A Catalogue of the Collection of Cambrian and Silurian Fossils in the Geological Museum of the University of Cambridge, with a Preface by Rev. Adam Sedgwick, and a Table of Genera and Index added by Prof. Morris, 1875.

Lower Cambrian.

Harlech group: *Conocoryphe lyelli* Hicks, p. 2.

St. David's group: *Plutonia* gen. nov. *sedgwicki* Hicks, p. 2, fig.

Leperditia (or *Primitia?*) *prima* Hicks.

Paradoxides harknessi Hicks.

Microdiscus sculptus Hicks.

Agnostus cambrensis Hicks.

Middle Cambrian.

Menevian group: *Agnostus princeps* Salter; *A. sp.*, p. 4, fig.; *A. davidis* Salter; *A. scarabaeoides* Salter; *A. cambrensis* Hicks, and *A. lagena* new form; *A. escutalis* Salter; *A. barrandei* Salter; *A. eskriggei* iHcks; *A. reticulatus* Angelin; *A. acumensis* Hicks.

Microdiscus punctatus Salter, p. 4, fig.

Holocephalina primordialis Salter, p. 4, fig.

Conocoryphe variolaris Salter, p. 5, fig.; *C. applanata* Salter; *C. humerosa* Salter, p. 5, fig.; *C. bufo* Hicks; *C.? homfrayi* sp. nov.; *C. sp.*; *C. coronata* Barr., p. 5 fig.

Erinnys venulosa Salter, p. 5, fig.

The fry of a Trilobite, p. 5, fig.

Paradoxides davidis Salter, p. 6, fig.; *P. hicksii* Salter; *P. aurora* Salter.

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Anopolenus henrici Salter, p. 6, fig.; *A. salteri* Hicks, p. 6, fig.

Arionellus longicephalus Hicks Mss. p. 7, fig.

Olenus sp. (*O. gibbosus*) Belt. 1867, p. 7, fig.; *O. cataractes* Salter.

Primitia solvensis Jones; *P. buprestis* Salter; *P. vexata* Hicks.

Hymenocaris major Salter, sp. nov., p. 7, fig.

Ffestiniog group: *Hymenocaris vermicauda* Salter, p. 10, fig.

Agnostus trisectus Salter; *A. princeps* Salter, p. 10, fig.

Olenus micrurus Salter; *O. plantii* Salter, sp. nov., p. 11, fig.; *O.* (*Parabolina*) *spinulosus* Wahl.; *O.* (*Peltura*) *scarabaeoides* Wahl.; *O.* (*Sphaerophthalmus*) *flagellifer* Ang., p. 11, fig.; *O.* (*Sphaeropht.*) sp.; *O.* (*Sphaeropht.*) *alatus* Boeck; *O.* (*Sphaeropht.*) *expansus* sp. nov.; *O.* (*Sphaeropht.*) *humills* Phillips; *O.* (*Sphaeropht.*) sp.; *O.* (*Sphaeropht.*) *bisulcatus* Phillips; *O.* (*Sphaeropht.*) sp.; *O.* (*Sphaeropht.*) *pecten* Salter, p. 12, fig.

Conocoryphe? ecorne Ang.; *C. williamsoni* sp. nov., p. 12, fig. (The *Beltella bucephalus* Lake, 1919); *C.* (*Conocephalus*) *invita* Salt., p. 13, fig.; *C. abdita* Salt.

Dikelocephalus celticus Salt., p. 13, fig.; *Dikelocephalus* sp.

Tremadoc Group: *Niobe homfrayi* Salter, p. 14, fig.

Psilocephalus innotatus Salter, p. 15, fig.; *P. inflalus* Salt.

Conocoryphe depressa Salt., p. 15, fig.; *C. verisimilis* Salt.

Dikelocephalus (*Centropleura*) *furca* Salter, p. 15, fig.

Angelina sedgwickii Salt., p. 17, fig.

Dikelocephalus furca Salt., p. 17, fig.

Asaphus (*Isotelus?*) *affinis* McCoy; *A.* (*Isotelus*) *homfrayl* Salt., p. 17, fig.

Ogygia scutatrix Salt. (hypostoma).

Cheirurus frederici Salter, p. 17, fig.

Skiddaw Group:

Agnostus hirundo Salter, Mss., p. 2, fig.; *A. morei* Salt.

Phacops nicholsoni Salter.

Calymene vexata Salt. (with *Asaphus menapiae*) undescribed; *C. ultima* Salter (*C. ramseiae* Hicks), undescribed; *C. tristani* Brong.; *C. parvifrons* Salter.

Dionide atra Salter.

Trinucleus gibbsii, p. 23, fig.

Ampyx salteri Hicks, Mss.

Homalonotus sp. (*H. bisulcatus*) p. 22, fig.; *H. monstrator* Salt., undescribed.

Aeglina caliginosa Salt.; *A. boia* Hicks; *A. binodosa* Salt., p. 23, fig.; *A. grandis* Salt.

Ogygia selwynii Salt., p. 23, fig.; *O. peltata* Salt.; *O. sp.; O. bullina* Salt.

Asaphus solvensis Hicks, Mss.; *A. menapiae* Hicks, undescribed, p. 3, fig.

Upper Cambrian, (Cambrian-Silurian).

Lower Bala Group: *Cythere* (*Cytheropsis*) *aldensis* McCoy, p. 31, fig.

Primitia, one or two species.

Beyrichia complicata Salter, p. 31, fig.

Agnostus maccoyii Salter; *A.* sp.

Diplorrhina triplicata syn., p. 31, fig.

Trinucleus favus Salt. (*T. gibbifrons* & *T. caractaci* McCoy, p. 144) p. 31, fig.; *T. fimbriatus* Murch. (*T. gibbifrons* as var. of McCoy, p. 145.)

Ampyx nudus Murchison.

Conocoryphe monile Salt., sp. nov., p. 32, fig., *Conocoryphe* or *Triarthrus*.

Aeglina sp.; A. sp.

Ogygia cordensis; O. buchii Brong., p. 32, fig.; *O. angustissima* Salter.

Barrandia (*Ogygia*) *radians* McCoy, p. 33, fig.; *B. cordai* McCoy.

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SALTER, J. W.—Continued.

Asaphus? sp.

Lichas patriarchus Edge.

Cheirurus (Eccoptochile) sedgwickii McCoy.

Calymene cambrensis Salt., p. 33, fig.

Homalonotus bisulcatus Salter.

Asaphus (Isotelus) laticostatus McCoy, (not of Greene); *A. tyrannus* Murch., p. 33 fig., hypostoma, p. 34, fig.

Illaenus crassicauda.

Middle Bala Group: *Ceratiocaris? umbonatus* Salt.

Primitia maccoyii Salt. Mss.; *P. maccoyii,* var.; *P. strangulata* Salt., p. 48, fig.

Agnostus trinodus Salt.

Lichas laciniatus Dalm.; *L. laxatus* McCoy; *L. (Trochrus) nodulosus* Salt., p. 50, fig.

Acidaspis brightii Murch., p. 50, fig.

Staurocephalus murchisoni Barr.

Sphaerexochus boops Salt. (syn. *Ceraurus clavifrons* McCoy, pl. 1F, fig. 12) p. 50, fig.

Cheirurus juvenis Salter, (*Ceraurus clavifrons* McCoy, pl. 1G, fig. 9), p. 51, fig.; *C. octolobatus* McCoy.

Cybele verrucosa Dalm.; *C. rugosa* Portl., p. 50, fig.

Encrinurus multiplicatus Salt.; *E. sexcostatus* Salt.

Phacops (Acaste), p. 52, fig.; *P. (Acaste) apiculatus* Salt.; *P. (Acaste) alifrons* Salt.; *P. (Chasmops) macrourns* Sjögren; *P. (Chasmops) conicophthalmus* Boeck.

Calymene senaria Conrad; *C. blumenbachii* Brong.; *C.* var. *caractaci* Salt.

Homalonotus bisulcatus Salt.; *H. sedgwickii* Salt.; *H. rudis* Salt.

Asaphus powisii Murch.; *A. radiatus* Salter.

Illaenus bowmanni Salt.; *Ill. davisii* Salt.; *Ill. rosenbergii* Eichwald; *Ill.* sp.

Harpes parvulus McCoy.

Upper Bala Group: *Beyrichia complicata.*

Phacops stokesii Milne Edw.

Cyphaspis megalops McCoy, p. 77, fig.

Cheirurus bimucronatus Murch.

Illaenus thompsoni Salter; *Ill. bowmani* Salter.

Lichas bulbiceps? Salter & Phillips.

Encrinurus punctatus Brünn, p. 77, fig. (the same fig. on p. 51); *E. punctatus* arenaceus *Salter.*

Calymene blumenbachii Brong.

Phacops obtusicaudatus Salt.; *P. sp.*

Silurian.

May Hill Group:

Crustacea.

Encrinurus punctatus Brünn.

Cheirurus bimucronatus Murchison.

Phacops stokesii Milne Edw.; *P. weaveri* Salt.; *P. caudatus* Brong.

Illaenus thompsoni Salter.

Proetus stokesi Murch., p. 56, fig.

Silurian.

Lower Wenlock Group:

Homalonotus cylindricus Salt.

Phacops downingiae Murch. and var. *cuneatus* Salt.; *P. caudatus. corrugatus* Salt.; *P. stokesii* Milne Edw.

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Acidaspis hughesii sp. nov., p. 93, fig.

Phyllopoda.

Peltocaris anatina sp. nov., p. 93, fig.

Wenlock Group:

Lichas, p. 130, fig.; *Lichas scutalis* Salt. mss.; *L. salteri* Fletcher; *L. grayii* Fletcher & Salter; *L. hirsutus* F. & S.; *L. barrandei* F. & S.; *L. anglicus* Beyrich.

Cheirurus Beyrich, *Cheirurus bimucronatus* Murchison.

Eucrinurus Emmrich; *E. punctatus* Brünn; *E. variolaris* Brong.

Sphaerexochus Beyrich, *S. mirus* Bey., p. 131, fig.

Staurocephalus Barr., *S. murchisoni* Barr.

Phacops downingiae Murch. and var. *constrictus* Salt.; *P. stokesii* Milne Edw.; *P. musheni* Salt.; *P. caudatus* Brong.; *P. longicaudatus* Murch. and var.; *P. grindrodianus*, also var. *armiger* Salt.; *P. tuberculato-caudatus* Salt.

Calymene Brong. *C. blumenbachii* Brong.; *C. tuberculosa* Salt.

Homalonotus König, p. 133, fig., *H. delphinocephalus* Green; *A. johannis* Salt.

Illaenus insignis Hall.

Cyphaspis Burmeister, *C. megalops*, p. 133, fig.

Proetus Steininger, p. 133, fig., *P. sp.; P. latifrons* McCoy; *P. fletcheri* Salt.; *P. stokesii* Murch.

Acidaspis Murchison, p. 134, fig.; *A. coronata* Salt.; *A. brightii* Murch.; *A. dama* Fletcher & Salter; *A. quinquespinosa* F. & S.; *A. barrandei* Ang.

Lower Ludlow Group:

Ceratiocaris McCoy, p. 165, fig.; *C. leptodactylus* McCoy; *C. robustus* Salter.

Ptyygotus (Agassiz), p. 165, fig.; *P.* ?; *P. arcuatus* Salter.

Slimonia Page, p. 165, fig.; *S. punctata.*

Proetus latifrons McCoy, p. 165, fig.

Phacops downingiae Murch.; *P.* (*Portlockia*) *stokesii* Milne Edw., p. 166, fig.

Calymne blumenbachii Brong.; *C. tuberculosa* Salt.

Acidaspis coronata Salter, p. 166, fig.

Upper Ludlow Group:

Phyllopoda.

Dictyocaris slimoni Salter, p. 177, fig.

Beyrichia kloedeni McCoy, and var. *plicata* McCoy.

Ceratiocaris inornatus McCoy, p. 178, fig.; *C. solenoides* McCoy; *C. papilio* Salt.; *C. atygius* Salt.; *C. ellipticus* McCoy.

Hemiaspis aculeatus Salter, p. 178, fig.

Eurypterida (*Hemiaspis*).

Eurypterus cephalaspis Salt.; *E. lanceolatus* Salt.

Pterygotus sp.; P. bilobus Salt., p. 179, fig.; *Pterygotus* 2 sp.; *P. perornatus* Salt.; *P. gigas; P. banksii* Salt.

Slimonia acuminata Salt.; *S.* sp. nov?

Beyrichia klöedeni McCoy, p. 189, fig.

Leperditia marginata Keys, p. 189, fig.

SCHLUETER, CLEMENS. Ueber *Trilobites verticalis* Burm. und *Phillipsia verneuili* Barr., 1846.—Verhandl. der naturhist. Vereins für Rheinland und Westf., Sitzungsb., 1880, p. 226.

————Zuletzt legte Redner *Cryphaeus* (*Asteropyge*) *limbatus* aus den Dachschiefern von Bundenbach vor.—Sitzungsb. der Niederrheinischen Ges. in Bonn, 1881, p. 77.

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SCHLUETER, CLEMENS.—Continued.

————Legte einen der Gruppe der Merostomen angehörigen Krebs aus den Rheinischen Unter Devon vor.—Sitzungsb. der Niederrheinischen Ges. in Bonn, 1881, p. 210.

Eurypterus cf. *pygmaeus* Salter.

SCHMIDT, E. *Cryphaeus* in den Siegener Schichten.—Monatsberichte der Deutsch. Geol. Ges., 1907, pp. 1-12, fig. in text.

Cryphaeus (*Asteropyge*) *atavus* sp. nov., pl. 10, fig.

SCHUMACHER, R. Ueber Trilobitenreste aus dem Unterkarbon im östlichen Theil des Rossbergmassivs in den Südvogesen.—Zeitschr. Deutsch. Geol. Ges., Vol. 55, 1903, pp. 432-438, pl. 19.

SCHWARTZ, — —. South African Palaeozoic Fossils.—Record Albany Museum, Vol. 1, 1906, pp. 347-404, plates 6-10.

SEEMAN, F. Das Mitteböhmische Obersilur, und Delongebiet S. W. der Beraun.—Beiträge zur Palaeont. & Geol. Oesterreich-Ungarns, Bd. 20, 1907, pp. 69-114, pl. IX, X.

SHIPLEY A. E. Introduction to Arachnida and Xiphosura.—The Cambridge Nat. Hist., Vol. IV, 1920, pp. 253-279, figs. in text 151-160.

Palaeozoic.

Subfamily 1, Xiposuridae.

Genera, *Hemiaspis, limuloides,* fig. 159; *Belimurus reginae,* fig. 160.

In the Palaeozoic genera the median or axial part of the dorsal surface is raised and distinctly limited on each side, so presenting a trilobed appearance similar to that of Trilobites. In *Neolimulus, Belinurus* and *Prestwichia* lateral eyes are present on the sides, on the axial parts of the carapace, and near its front margin; median eyes have been found in the two last named genera.

The author also remarks that *Aglaspis* has been regarded as a Xiphosuran. Other genera of Palaeozoic Xiphosura are *Bunodes, Bunodella, Pseudomiscus, Protolimulus* and *Prolimulus.*

The generic name *Prestiwichia* Woodward, 1867, not Lubbock, 1863, is a synonym and the genus *Euproops* is available in its place.

SIEBURG, R. Ueber transversale Schieferung im Thüringischen Schiefergebirge (Inaugural-Dissertation).—Zeitschr. für Prakt. Geol. Vol. 17, 1909, pp. 233-262, figs. plate 3.

The plate illustrates "Trilobiten aus dem ostthüringischen Griffelschiefer," fig. 12-15 without description.

SIEMIRADZKI, J. VON. Die Paläozoischen Gebilde Polodiens 11.—Beiträge Palaeontoesterr.—Ung., Vol. 19, 1906, pp. 213-286.

SJÖBERG, SIG. Beschreibung einer neuen Trilobiten-Art aus dem Schwarzen Trinucleusschiefer Ostergothlands.—Geol. Förens, Förhandl., Bd. 40, 1918, pp. 457-460, pl. 7.

Gives list of the Ostergothlands *Trinucleus* beds.

Telephus wegelini Ang.; *Proetus papyraceus* Törnquist, *Trinucleus seticornis* His.; *Calymene trinucleina* Linrs.; *Remopleurides radians* Barr.; *Ampyx portlocki* Barr., of the Trilobites.

Ostracoda.

Lepidocoleus suecicus Mbg.; *Plumulites sp.*

With figs. and description of *Niobe cunctatrix* sp. nov., p. 458, pl. 7, fig. 1, 2 from Ullnäs.

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SOBOLEV, D. Materialien zur Geologie Russlands. (In Russian).—The Middle Devonian of the Kielce-Sandomir Mountains.—Kaiserlichen Mineralogischen Gesellschaft, Bd. 24, 1909.

Trilobita:

Bronteus granulatus Golf., p. 381, p. 3, fig. 1.

Phacops sp. (cf. *fecundus* Barr.), p. 382; *P. latifrons* Bronn, p. 382; *P. schlotheimi* Bronn, p. 338; *P. breviceps* Barr., p. 383, pl. 3, fig. 6a, b; *P.* cf. *breviceps* Barr., p. 384, pl. 3, fig. 3, 4; *P. sp.*, p. 386, pl. 3, fig. 5a-c.

Acidaspis sp. Gür., p. 387.

Cyphaspis sp., p. 387.

Proetus crassimargo A. Roemer, p. 388, pl. 3, fig. 7; *P. margaritaceus* Gürich, p. 388; *P. sp.*, p. 389; *P. pyriformis* Gür., p. 389; *P.* cf. *cornutus* Foldf., p. 389.

Dechenella? dombrowiensis Gürich, p. 389, pl. 3, fig. 8, 9; *D. polonica* Gür., p. 392, (both referred by Richter to subgenus *Eudechenella*).

Ostracoda:

Entomis sp., p. 392 & 393.

Leperditia amphiporae Gürich, p. 393.

Primitia humiliformis Gürich, p. 393; *P. ubiqua* Gürich, p. 393; *P. ornatissima* Gür., p. 393; *P. plana* Gür., p. 393; *P. lentiformis* Gür., p. 393; *P. fabaeformis* Gür., p. 393; *P. sp.*, p. 393.

Primitiopsis? pisciformis Gür., p. 394.

Beyrichia? trigonata Gür., p. 394.

Bollia sp., p. 394.

Polyzygia symmetrica Gürich, p. 394.

Poloniella devonica Gürich, p. 394.

SOMMER, K. Die Fauna des Culm vcn Königsberg bei Giessen.—N. J. für Min., Beilage, Bd. 28, 1909, pp. 611-660, pl. 27-30.

Crustacea:

Phillipsia eichwaldi hassiaca, p. 652, pl. 29, fig. 17, (pygidium).

Phillipsia gemmulifera, p. 652, pl. 28, fig. 6, (pygidium).

SPRIESTERSBUCH, JULIUS, & FUCHS, ALEXANDER. Die Fauna der Remscheider Schichten.—Abhandl. Geol. Landesanstalt, N. F., Heft 58, 1909.

Crustacea:

Beyrichia montana sp. nov., p. 48, pl. 7, fig. 11, 11a; pl. 8, fig. 1, 2; *B. embryoniformis* sp. nov., p. 50, pl. 7, fig. 8-10.

Entomis sp., p. 51.

Cryphaeus sp., p. 51.

STAFF, HANS VON und RECK, HANS. Ueber die Lebensweise der Trilobiten.—Sitz. der Gesellschaft Nat. Freunde zu Berlin, No. 2, Jahrb., 1911, pp. 130-146, 19 figs.

The use of the pygidium as a swimming organ, suggested by Spencer in Geol. Mag., Decade IV, Vol. 10, 1911, on theoretical grounds, was well developed by the authors from a mechanical standpoint, and elaborated by evidence from ontogeny, phylogeny and musculature, providing the animal with a swifter means of locomotion. By a sudden flap of this large fin, a backward, darting motion could be obtained, which would be invaluable as a means of escape from enemies.

Staff and Reck seem to think that in this movement the two shields were clapped together, and that the animal was projected along, with the hinge-like thorax forward.

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STAFF, HANS VON UND RECK, HANS.—Continued.

The authors give entire figures of *Olenellus* (*Holmia*) *bröggeri*, fig. 1; *Harpes ungula*, fig. 2, 3; *Olenellus thompsoni*, fig. 4; *Dalmanites caudatus*, fig. 5; *Microdiscus speciosus*, fig. 6; *Agnostus pisiformis*, fig. 7; *Leiagnostus erraticus*, fig. 8; *Microdiscus bellimarginatus*, fig. 9; *Aeglina rediviva*, fig. 10; *A. pachycephala*, fig. 11; *A. prisca*, fig. 12; *Illaenus schmidti*, fig. 13, 14; *Bronteus brongniarti*, fig. 15; *Asaphus kowalewski*, fig. 16; *Illaenus sinuatus*, fig. 17; *Deiphon forbesi*, fig. 18; *Acidaspis mira*, fig. 19.

STAINER, X. Stratigraphie du bassin Huiller de Charleroi et de la Basse-Sambre.—Bull. Soc. Belge de Geol. & Paleont. &c., Tome XV, 1901, p. 43.

Announces the discovery of the thorax, apparently of a new species of *Prestwichia* (*Euproops*).

STAUFFER, CLINTON R., HUBBARD, G. D. & BROWNOCKER, J. A. Geology of the Columbus Quadrangle.—Bull. Geol. Sur. Ohio, 14, Ser. 4, 1911, pp. 1-33, pl. 8-13.

Not descriptive; figures on plates.

Pl. XI. *Phacops cristatus* Hall, fig. 3, 4; *Chasmops calypso* Hall, fig. 5; *Coronura diurus* Green, fig. 6, 7; *Proetus rowei?* Green, fig. 9.

Pl. XII. *Phacops rana*, fig. 24.

Pl. XIII. *Phillipsia lodiensis* Meek, fig. 15.

STEINMANN, — —. See KNOD, R. VON.

STEPHENS, T. On the discovery of Trilobites and other Silurian Fossils in Tasmania.—Proc. Roy. Soc. Tasmania, 1874, p. 27.

STRAELEN, V. VAN. See VAN STRAELEN, V.

SVENONIUS, FR. Beskrifning till Kartbladen Forsmark och Björn.—Sveriges Geol. Undersökning, Ser. A/a, No. 98 & 99.

Seite 31, Nach den Bestimmungen der Herren J. C. Moberg und G. O. von Schmalensee, gehöre die hier vorkommenden Fossilien zu folgenden Arten.

Crustacea:

Lower Orthocerenkalk.

Megalaspis limbata Boeck; *M. stenorachis* Ang.

Niobe cf. *emarginula* Ang.; *N. sp.*

Illaenus esmarcki Schlot.

SWINNERTON, H. H. The Facial Suture of Trilobites.—Geol. Mag., Decade VI, Vol. 6, 1919, pp. 103-110.

This paper takes under consideration the following questions:

The segmentation of the head; the position of the eye; the ecdysial line in Mesonacidae; the ecdysial line in Agnostidae; the ecdysial line in Trinucleidae; the incorrect usage of embryological evidence.

The Trilobites are Monophyletic.

————Suggestions for a Revised Classification of Trilobites.—Geol. Mag., Decade VI, Vol. 2, 1915, pp. 487-496 & 538-546.

The author remarks that Beecher's classification has been adopted without modifications of its broad lines by English and American, but not by all continental writers. Among the latter, Gürich and Jaeckel have recently suggested systems which differ materially from Beecher.

Swinnerton gives Gürich's classification on p. 488, and remarks that Jaekel, after careful study of the Agnostidae, considers that these Trilobites are sufficiently distinct from all others to warrant their being placed in a separate

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division equal in value to that containing all other Trilobites. He therefore proposed the name Miomera for those which, like Agnostidae and Microdiscidae, have only three trunk segments, and Pliomera for all with six or more free segments.

Swinnerton's classification of Trilobites.

Progressive stages:

Micropygous, without free cheeks. (Order Protoparia.)

Heteropygous, with free cheecks, which may be lost secondarily.

Isopygous.

Order Opisthoparia:

Mesonacidae; Homopleuridae; Paradoxidae; Zacanthoidae; Proetidae; Olenidae; Oryctocephalidae; Conocoryphidae; Selenopleuridae; Ptychoparidae; Dikelocephalidae; Bathyuridae; Asaphidae; Illaenidae; Calymenidae; Homalonotidae; Trinucleidae; Harpedidae; Raphioridae; Ellipsocephalidae; Aeglinidae; Shumardidae.

Odontopleurides: Lichadidae; Bronteidae.

Order Proparia:

Encrinuridae; Cheiruridae; Phacopidae; Burlingidae; Agnostidae?

All those families whose descent can be traced back to the Conocoryphid type of primitive Trilobites may be placed in the suborder Conocoryphida, which may be broken into four sections, viz: Conocoryphina; Olenina; Ptychoparina; and Calymenina.

TORLEY, K. Die Fauna des Schledenhofes bei Iserlohn, (Devonian).—Abhandl. der Königlich Preuss. Geol. Landesanstalt, N. F. 53, 1908, pp. 1-56, plates I-X.

XI. Trilobita, p. 46.

Bronteus granulatus Goldf.

Phacops breviceps Barr.

Proetus cornutus Goldf.

Trigonaspis? cornuta Sandber., 1856, pl. 3, fig. 3.

Proetus crassimargo Roem.; *P.* cf. *astyanax* Holz.

Cyphaspis hydrocephala Maurer.

Lichas sp.

Harpes sp.

TOUCHE, J. D. LA. See LA TOUCHE, J. D.

TROEDSSON, GUSTAF T. On Skänes Brachypodskiffer, 104 pages, 2 plates, 13 figs. in text.—Lunds Univ. Arsskrift, N. F. Avd. 2, Bd. 15, No. 3. —Kungl. Fysiografiska Sällskapets Handlingar, N. F., Bd. 30, No. 3, 1918.

The author notes the following species with descriptions and illustrations, and an English summary.

Phyllocaridia :

Ceratiocaris sp.

Cirrepedia:

Lepidocoleus suecicus Mrg.

Ostracoda:

Primitiella tenera Linrs.; *P. harparum* sp. nov.; *P. conica* sp. nov.; *P. bursa scanensis* var. nov.; *P. ?bilba* sp. nov.; *P.* cf. *tolli* Bonnema.

Aechmina grönwalli sp. nov.

Ctenobolbina sexpapillosa sp. nov.; *C. rara* sp. nov.

Bollia harparum sp. nov.; *B. biplicata* sp. nov.

Jonesina rectangularis sp. nov.

Trilobita:

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TROEDSSON, GUSTAF T.—Continued.

Dalmanites eucentrus Ang. (Olin emend.); *D. mucronatus* Brong.; *D. kiaeri* sp. nov.

Ampyx acus sp. nov.

Trinucleus sp.

Homalonotus platynotus Dalm.

Acidaspis olini sp. nov.

Harpes sp.

Proetus sp.

Bibliography Om Skänes Brachyopodskiffer, pp. 100-104.

The author gives a comparison between *Dalmanites eucentrus* and *D. mucronatus.*

	D. eucentrus	*D. mucronatus*
Frontal limb	Very thin, commonly not visible.	Broader and well developed.
Lateral furrows of glabella	Shallow.	Deep.
Frontal lobe	Without tubercles.	Covered with coarse tubercles.
Posterior branch, facial suture	Slightly sigmoid.	Strongly sigmoid, (young specimens; largest specimens more like *D. eucentrus.*)
Eyes	Reaching from the anterior to the middle, (large specimens) or to between the middle and posterior pair of furrows (ephebic specimens.)	Ephebic specimens, large, reaching from the anterior to the posterior pair of lateral furrows. Larger specimens like *D. eucentrus.*
Pygidium, axis rings	8-9.	11-13.
Pleurae	6-7; anterior part about half as broad as the posterior, which widens outward.	8-9; two halves equally developed. Neanic specimens sometimes like *D. eucentrus.*
Furrows of lateral portions	Oblique and interpleural furrows equally developed.	Oblique furrows generally more marked than interpleural ones.

The ontogenetic development of *D. eucentrus* is closely allied to that of *D. socialis.*

The nepionic stage of development of the head has more pleurae than adult specimens, which depends on the fact stated by Richter that the posterior pleurae tend to fuse along the axis.

D. eucentrus belongs perhaps to that primitive section of the *Dalmanites* group which has been termed *Dalmanitina* Reed, but the strange alternation of the appearance of the two named species, in the succeeding life zoaeas, suggests more, that *D. eucentrus* is an immature stage of *D. mucronatus,* and a result of retarding external circumstances, after the ceasing of which, a perfect development has taken place.

Ulrich, A. [illegible]

ULRICH E. O. Ordovician Hypoparian Genera of Trilobites.—Abstr. Bull. Geol. Soc. Am., Vol. 33, 1922, pp. 205-206.

The author discussed the character, interrelations, stratigraphic position, and

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geologic distribution of the Agnostidae, Trinucleidae, and Ampyxidae found in the Ordovician formation in America.

Most of the genera were shown to have originated in the North American Atlantic realm, from which they invaded the Appalachian Valley troughs.

Only *Cryptolithus* seems to have had a more southern origin, most of its species having invaded the interior continental seas by way of the Mississippi embayment.

Trinucleidae & Harpeidae.

The author disapproved the prevailing view that the marginal suture of species of these families corresponded to the facial suture. He opposed the view that the facial suture in these trilobites ran as in the Opisthoparia and became closed by fusion early in the life of the individual.

He held that the marginal suture became a necessary convenience in moulting and possible through the lateral and the posterior extension of the epistoma. He remarks that *Olenellus* has a ventral plate that is comparable to the ventral plate of the cephalon of *Harpes*.. As is well known, the facial suture in *Olenellus* is quite as well fused as in *Harpes*.

Endymionidae.

The author questioned the desirability of the family Endymionidae Raymond, and dissents from the prevailing practice of referring all Ordovician Harpeidae, except *Harpides*, to *Eoharpes* Raymond. He prefers to retain most of them in the genus *Harpes*.

Ampyxidae.

He remarks that *Raphiophorus* Angelin cannot be separated satisfactorily from *Ampyx*, but *Lonchodomus* is distinguishable by differences in the facial suture and in the anterior margin of the cephalon.

Ampyxina bassleri gen. nov. et sp. nov.

A new genus is proposed for a small Ampyxid with a small and verv short rostral spine, obovate glabella, small pair of isolated posterior lateral glabellar lobes and 4 to 5 thorax segments. The pygidium differs from *Ampyx* and *Lonchodomus* in wanting the thick, striated and beveled posterior edge.

Maquoketa shale, Louisiana, Missouri.

Some six species are known, but older than the genotype, Lower Trenton and Chazyan, not at present described. Rowley illustrated and described as gen.? sp.? *Ampyzina bassleri* in the Geol. of Pike County, Mo., Bur. Mines, Vol 8, 1909, p. 60, pl. 15, fig. 12-14.

VAN STRAELEN, V. Quelques Eumalacostracés Nouveaux du Westphalien Inférieure d'Argenteau prés Lié.—Ann. Soc. Geol. de Belgique, Tome XLV, Mémoires, 1922, pp. 35-40, plate 2.

Palaeocaris lohesti, sp. nov., p. 36, fig. 1 in text; pl. 2, fig. 1.

Compared with *P. burnetti* Woodward, the new species differs in the telson and uropodes, which are of the same length in *P. burnetti*, but in *P. lohesti* the length of the uropodes is three times that of the telson.

Perimecturus frayponti, sp. nov., p. 37, fig. 2 in text; pl. 2, fig. 2, 3, 5.

The author divides the genus *Perimecturus* Peach into two groups:

Group 1. *P. parki* Peach; *P. stocki* Peach; *P. communis* Peach.

Group 2. *P. elegans* Peach; *P. pattoni* Peach; *P. ensifer* Peach; *P. frayponti* Straelen.

Anthracomysis rostrata, sp. nov., p. 39, fig. 5 in text; pl. 2, fig. 4.

The genus is placed under a new subfamily, Anthracomysidinae.

————Sur la présence d'un Xiphosure dans le Westphalien des Environs de Liége.—Ann. Soc. Géol. de Belgique, Tome XLV, Bulletin, 1922, pp. 91, 92.

Prestwichia rotundata de Koninck, 1881, (pro parte) is referred to *Prestwichianella* (for de Koninck's figures of the pygidia, No. 1 & 2).

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VENUKOV, P. N. Die Fauna der Silurischen Ablagerungen des Gouvernements Podolien.—Verh. Russ. K. Min. Ges., Ser. XIX, 1899, pp. 21-266, pl. 1-9.

VINASSA, REGNY P. E.DE. Fauna dei Calcari con *Rhynchonella megaera* del Passo di Volaia.—Bull. Soc. Geol. Ital., Vol. 27, 1909, pp. 547-592, fig. pl. 20.

WADE A. On the Llandovery and Associated Rocks of North-Eastern Montgomeryshire.—Quart. Jour. Geol. Soc., Vol. 67, 1911, pp. 415-459, pl. 33-36.

Notes on the Palaeontology of the area, pp. 449-456.

Trinucleus intermedius sp. nov. The name *intermedius* was used by Münster for a species of *Trinucleus* in 1842, which is now referred to *Goldius subradiatus*.

This remarkable species is readily distinguished from *Cryptolithus concentricus* by the large, pendent ears of the fringe and the direct backward extension of the spines. From *T. lloydii* it is distinguished by the subtriangular tail.

Dionide sp?

Ostracoda:

Melanella gen. nov.

Carapace small, equivalve, moderately convex, rather flattened anteriorly, straight; valves with a small, faintly raised, horseshoe ridge confined to the posterior half, enclosing a small, semi-circular sulcus; eyes simple.

Melanella homidiscus sp. nov.

Primitiella unicornis Ulrich.

Primitia ulrichi Jones; *P. tumidula* Ulrich.

Ctenobolbina cf. *ciliata* Emmons.

Bollia lata Vanuxem.

Krausella arcuata Ulrich.

WALCOTT, CHARLES D. Cambrian Geology and Palaeontology, IV. No. 3, Fauna of the Mount Whyte Formation.—Smith. Misc. Coll., Vol. 67, No. 3. 1917, pp. 62-114, pl. 8-14.

Agraulos charops sp. nov.; *A.? unca* sp. nov.

Olenopsis cleora sp. nov.; *O. crito* sp. nov.; *O. leuka* sp. nov.

Ptychoparia adina sp. nov.; *P. carina* sp. nov.; *P.? cercops* sp. nov.; *P.? cleadas* sp. nov.; *P. cleon* sp. nov.; *P. clusia* sp. nov.; *P. cosus* sp. nov.; *P. pia* sp. nov.; *P. skapta* sp. nov.; *P. thia* sp. nov.; *Ptychoparia* sp. undetermined. *cunras* sp. nov.; *P. gogensis* sp. nov.; *P. lux* sp. nov.; *P. perola* sp. nov.; *P.*

Crepicephalus cecinna sp. nov.; *C. celer* sp. nov.

Dorypyge damia sp. nov.

The author remarks that *P.? cleadas* may be readily separated from other species of the genus *Ptychoparia* by its very small size and angular outline, its sharply defined trapezoidal glabella, and its very small anterior eye, placed far forward so that the posterior lobe is consequently very wide, &c.

(It might be compared with *Lloydia*.)

————Cambrian Geology and Palaeontology, IV. No. 4. Appendages of Trilobites.—Smith. Misc. Coll., Vol. 67, No. 4, 1918, pp. 115-216, pl. 14-42, figs. in text 1-3.

Description of species with appendages.

Neolenus serratus (Rominger); *Kootenia dawsoni* (Walcott); *Isotelus maximus* Locke; *I. covingtonensis* Ulrich? Mss.; *Triarthrus becki* Green; *Ptychoparia cordillerae* (Rominger); *Calymene senaria* Conrad: *Ceraurus pleurex-*

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anthemus Green; *Odontopleura trentonensis* (Hall); *Cryptolithus concentricus* Eaton.

Section 2. Structure of the Trilobite.

Respiration of the Trilobite.

Restoration of the ventral appendages, &c.

Comparison with Crustaceans.

Comparisons of early authors.

Walcott compares the Trilobite with other modern crustaceans (e. g. Mysidacea, Euphausiacea, and some of the Schizopods), but they would only go to prove that the Trilobite is a primitive crustacean far back on the line of descent from the original crustacean type which existed in pre-Cambrian or Liparian time.

————Cambrian Geology and Palaeontology, IV. No. 7. Notes on Structure of *Neolenus*.—Smith. Misc. Coll., Vol. 67, 1921, No. 7, pp. 365-456, text figs. 15-23, pl. 91-105.

Notes on ventral appendages of *Neolenus serratus* by E. O. Ulrich, Rudolph Ruedemann and R. S. Bassler, with comments by C. D. Walcott.

The distinctness of epipodites from exopodites, with figures and descriptions; also supplementary notes on *Ceraurus pleurexanthemus, Calymene senaria* and *Triarthrus becki,* on the spiral branches, exopodite and pygidial endopodites of *Triarthrus.*

Internal organs, alimentary canal, abdominal sheath, hepatic glands, heart, musculature.

Use of pygidium in swimming. Coxopodites and trails of Trilobites. *Isotelus maximus* Lock. Ordovician crustacean leg, &c.

WALTER G. T. Upper Cambrian Trilobites.—Proc. Geol. Soc. Am., Vol. 32, No. 1, 1921, pp. 128-129.

The author remarks that as far as now known only three trilobites have been reported from the Upper Cambrian of Iowa, viz; *Dikelocephalus minnesotensis, Illaenurus quadratus* and a new species, *Illaenurus calvini.* These species are found in the Saint Lawrence limestone near Lansing, Iowa.

The first reference to *Illaenurus calvini* was in Geol. Sur., Vol. IV, p. 58. The species differs from *I. quadratus* in the presence of long postero-lateral extensions of the fixed cheeks.

WEDEKIND, RUD. Paläontologische Beiträge zur Geologie des Kellerwaldes.—Abhandl. der Königlich Preusschen Geol. Landesanstalt, N. F., Heft 69, 1914, pp. 83, pl. 5, Zweiter Theil. Trilobiten, pp. 23-82, pl. 1-5.

Die Phacopiden des Obersilurs im Kellerwalde.

A. Morphologie der Trilobiten mit besonderer Rücksicht auf die Phacopiden. Fig. 1-3, thorax segments; fig. 4, *Acaste brongniarti.*

B. Klassifikation der Phacopiden.

1. *Phacops* s. str. Gruppe des *Phacops latifrons* Bronn.
   Phacops fecundus, schlotheimi, breviceps, boecki, ferdinandi, munieri, douvillei, bufo, cacapona, rana.

2. *Trimerocephalus* McCoy, em. Wedekind.
   Trimerocephalus cryptophthalmus, granulatus, caecus, sulcatus, brevissimus, sp. drevermanni, anophthalmus.

(Gortani, 1907, places the genus under two subgenera, *Eutrimerocephalus* and *Microphthalmus.*)

3. *Reedia* gen. nov., Gruppe des *Phacops bronni.*
   Reedia cephalotes, sternbergi, bronni. fig. 5 and 6, *Reedia cephalotes* after Barrande.

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WEDEKIND, RUD.—Continued.

4. *Glockeria* gen. nov. Gruppe des *Phacops glockeri* Barr. fig. 7 and 8; *Glockeria trapeziceps*, fig. 9; *Denckmannites volborthi*, fig. 10; *Trimerocephalus cryptophthalmus*.
Glockeria bulliceps, trapeziceps, glockeri.

C. Uebersicht über die Genera und Subgenera der Phacopiden.
I. Unterfamilie Dalmanitinae Reed.
a. Subgenus *Dalamanitina* Reed.
b. Subgenus *Hausmannia* Hall & Clarke.
2. Genus *Odontocephalus* Conrad.
3. Genus *Glockeria* Wedekind, 1911.
(McLearn, 1918, places this genus under *Phacopidella* Reed.)
a. Subgenus *Glockeria* s. str.
b. Subgenus *Denckmannites* Wedekind, 1913.
II. Unterfamilie Phacopidinae.
4. Genus *Acaste* Goldfuss, 1843, (referred to *Dalmanites* Reed.)
a. Subgenus *Cryphaeus* Green, 1837, (referred to *Asteropyge* (Corda.)
5. Genus *Phacops* Emmrich.
a. Subgenus *Phacops* s. str.
b. Subjenus *Trimerocephalus* McCoy, 1849.
c. Subgenus *Reedia* Wedekind, 1911.

D1. Unterscheidende Kennzeichen der Arten von *Phacops* s. str.
(a) 1. *Phacops pompeckji* sp. nov.; 2. *P. elegantulus* sp. nov.
(b) 1. *Phacops planilimbatus* sp. nov.; 2. *P. rubidus* sp. nov.; 3. *P. tetricus* sp. nov.
Der Basallobus.
Phacops fecundus ex *P. schlotheimi, latifrons.*
Die Augen, &c.
a. Auge mit Palpebralhügel.
1. *Phacops globosus* sp. nov.; 2. *P. fecundus communis* Barr.
b. Die Augen Mitte der Wagen.
1. Basalseitenloben geknotet, *P. denckmanni* sp. nov.
2. Basalseitenloben nicht geknotet, *P. rubidus* sp. nov.
3. Basallobus, glabellar-furchen, &c., *P. superstes, breviceps, intermedius, signatus, koeneni, batracheus.*

D2. Beschreibung der Arten von *Phacops* s. str.
(1) Gruppe des *Phacops pompeckji* Wedekind.
1. *P. pompeckji* sp. nvo., p. 42, pl. 1, fig. 68 and text fig. 12.
2. *P. elegantulus* sp. nov., p. 43, pl. 1, fig. 2 and text fig. 11.
(2) Gruppe des *Phacops breviceps* Barr.
(3) Gruppe des *Phacops fecundus* Barr. (var. *major*).
(4) Gruppe des *Phacops planilimbatus* Wedekind.
3. *P. planilimbatus* sp. nov., pl. 2, fig. 4 and text fig. 13.
4. *P. tetricus* sp. nov. p. 48, pl. 2, fig. 1.
5. *P. rubidus* sp. nov., p. 50, pl. 3, fig. 4 and text fig. 14.
(5) Gruppe des *Phacops globosus* Wedekind.
6. *P. globosus* sp. nov., p. 51, pl. 2, fig. 3, text fig. 16.
7. *P. globosus* sp. nov., p. 51, pl. 2, fig. 3, text fig. 17.
8. *P. fecundus communis* Barr., pl. 2, fig. 5; pl. 3, fig. 3; pl. 4, fig. 1, text fig. 15.
(6) Gruppe des *Phacops primaevus* Clarke.

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9. *P. durus* sp. nov., pl. 3, fig. 6, text fig. 19, p. 57.
10. *P. latus* sp. nov., p. 59, pl. 2, fig. 2, text fig. 18.

E. Unterscheidende Kennzeichen der Arten vom *Reedia* gen. nov.
R. glabella; R. zorgensis Kays.; *R. cephalotes* Barr.
Die Augen, &c.
a. *Reedia sternbergi.*
b. Basalseitenloben: *R. clarki* sp. nov.
c. Glabella von Griefumschlagform: (a) Koptschild, *R. walcotti* sp. nov.; (b) Kopfchild lang und schmal. *R. steinhornensis* sp. nov.
Augen klein und flach, &c.: (a) Glabella am vorderrande breit und kurz gerundet; (b) Basallobus vorn und hinter, breite Furchen, &c.
a. Basis der Glabella unverhältnissmässig schmal, *Reedia friederici* sp. nov.
b. Basis der Glabella breit, Kopfschild nur wenig breiter als lang, *R. bronni.*
Kopfschild kurz und breit, *R. holmi* sp. nov.
a. Basallobus seitwarts unverkürzt, Basalseitenloben ungeknotet, *R. primaeva* sp. nov.
b. Glabella von Briefumschlagform, *R. acuticeps* Kays.

F. Beschreibung der Arten von *Reedia* gen nov.
(7) Gruppe des *Phacops* (*Reedia*) *sephalotes* Barr., p. 71.
11. *Reedia lotzi* sp. nov., p. 61, ul. 5, fig. 2.
(8) Gruppe des *Phacops* (*Reedia*) *bronni* Barr., p. 62.
12. *Reedia primaeva* sp. nov., p. 62, pl. 3, fig. 5.
13. *Reedia friederici* sp. nov., pl. 3, fig. 2; pl. 4, fig. 3, text fig. 20 21.
14. *Reedia holmi* sp. nov., pl. 5, fig. 3.
(9) Gruppe des *Pacops* (*Reedia*) *steinhornensis* sp. nov.
15. *Reedia steinhornensis* sp. nov., pl. 4, fig. 4, text fig. 24.
16. *Reedia walcotti* sp. nov., p. 69, pl. 3, fig. 1, text fig. 22 and 25.
17. *Reedia clarkei* sp. nov., pl. 4; fig. 2, text fig. 23 and 26.

Anhang, Phacopiden, Pygidien, p. 71.
18. *Phacops sp.* 1.
19. *Phacops sp.* 2.
20 *Phacops sp.* 3, p. 72.

G. Genus *Acaste* Goldfuss; Subgenus *Cryphaeus* Green.

H. Genus *Dalmanites* Barr.
21. *Hausmannia sp.* 1.
22. *Hausmannia sp.* 2.
23. *Hausmannia sp.* 3.
24. *Hausmannia sp.* 4, p. 74.

Die Bronteiden, Lichaden, Proetiden und Harpiden aus dem Obersilur des Kellerwaldes, p. 75.
(1) Gruppe des *Bronteus planus* Corda, p. 75.
(2) Gruppe des *Bronteus umbellifer* Beyr., p. 75.
a. Genus *Bronteus.*
25. *Bronteus* sp. nov.
b. Genus *Lichas.*
26. *Lichas* (*Euarges*) *pusillus* Ang., p. 77.
c. Genus *Cheirurus* Beyr.
27. *Cheirurus sternbergi* Boeck.
d. Genus *Acidaspis.*
28. *Acidaspis* cf. *minuta Barr.*, p. 79.
e. Genus *Proetus.*

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WEDEKIND, RUD.—Continued.

29. *Proetus obscurus* sp. nov., p. 79.
f. Genus *Cyphaspis* Burm.
30. *Cyphaspis* cf. *halli* Barr., p. 81.
31. *Cyphaspis sp.*, p. 87.
g. Genus *Harpes*.
32. *Harpes koeneni* sp. nov., p. 81, pl. 4, fig. 5.

New Subgenera.

Denckmannites gen. nov.; Gruppe de *Phacops volborthi* Barr.

Das halbkreisförmige Kopfschild wird von einem Limbus ganzlich umrande, Die einzelnen Abschnitte des Kopfschildes, Glabella und Wangen sind schwach gewölbt. Vom vorderrande des Kopfschildes steigt die Glabella in nur schwacher Wölbung an, ohne überstulpt zu sein. Die vordere und mittlere Glabellar-furchen sind nur schwach ausgebildet, während die dritte um ein Drittel der Glabellabreite tief in die Glabella einschneidet, ohne in der Mitte mit der anderseitigen zusammenzustossen.

Die minimal kleinen Augen erheben sich nicht ueber das Niveau der Wanen.

Gruppe des *Phacops* (*Reedia*) *cephalotes*.

Die Glabella ist relativ stark gewölbt und ängewöhnlich stark in Form einer dreieckigen Schnauze über den Frontallimbus vergestülpt.

Der Basallobus ist rudimentär und besteht nur aus einer schmalen Leiste. Hierher rechne ich drei mir aus eigener Anschaung bekannte Arten, nämlich *Reedia cephalotes* Barr., *Reedia lotzi* sp. nov., und *Reedia zorgensis* Kays. Die beiden ersten Arten sind dadurch von einander unterschieden, dass bei *Reedia cephalotes* Barr., die Augen sehr lang sind und fast bis zur Pleuroccipitalfurche reichen dass sie bei *lotzi* sp. nov. dagegen nicht über die Mitte der Wangen hinausreichen, *Reedia zorgensis* Kays. unterscheidet sich von beiden durch spitze.

Form der Galbella.

Gruppe des *Phacops* (*Reedia*) *bronni* Barr.

Das Kopfschild ist in den Wangentheilen stark abwärts gekrümmt. Im Gegensatz zu den Formen der Gruppe der *Reedia cephalotes* Barr., ist die Glabella bei den Formen der Gruppe der *Reedia bronni* Barr., flach und nicht oder doch nur immer sehr wenig über den Frontallimbus des Kopfschildes vorgestülpt. Der Vorderrand des Kopfschildes ist gerundet; die Augen sind durchweg klein, flach und von geringer Länge. Die meisten der hierher gehörigen, mir bekannt gewordenen Formen eustammen dem Obersilur des Kellerwaldes, *Reedia primaeva, Reedia friederici*, und *Reedia holmi*. *Reedia friederici* steht entschieden dem *Phacops bronni* Barr. sehr nahe.

Gruppe des *Phacops* (*Reedia*) *steinhornensis* sp. nov.

Das gesammte Kopfschild ist relativ flach, ebenso die Glabella, deren vordere Begrenzung meist dreieckig ist. Dabei ist sie stark über den Frontallimbus vorgestülpt. Der Basallobus bildt einen nur wenig verschmälerten zusammenhägenden Ring.

Heir schliesse ich anhangsweise auch *Reedia clarkei* an bei der Basallobus fast ganz rudimentär ist.

———Klassifikation der Phacopiden.—Zeitschr. der Deutsch Geol., Bd. 63, 1911, pp. 317-336, pl. 15, 16.

The author divides the Phacopidae into six groups.

Group 1. *Phacops fecundus* Barr., *Phacops* s. str., p. 317, pl. 15, fig. 1-4 and 6, text fig. 1.

Group 2. *Trimerocephalus* McCoy, *T. cryptophthalmus* Emmrich, equals *laevis*.

Group 3. *Phacops bronni*, equals *Reedia* gen. nov., p. 322, fig. 2.

The author places under the new genus *Reedia cephalotes* (Corda), *R. sternbergi* (Corda), and *Reedia bronni* (Barr.)

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Group 4. *Phacops glockeri*, equals *Glockeria* gen. nov., p. 323.

The new genus is proposed for a group similar to *Phacopidella* Reed, 1905, which has priority over *Glockeria*.

The author places three species under his new genus, *Glockeria trapeziceps* (Barr.), *G. bulliceps* (Barr.), *G. glockeri* (Barr.)

Group 5. *Phacops volborthi* Barr. equals *Denckmannia* gen. nov., p. 323.

The author includes three species under *Denckmannia*, *D. volborthi* (Barr.), *D. miser* (Barr.), *D. fugitivus* (Barr.)

Group 6. *Pterygometopidella* subgen. nov., p. 324.

P. quadrillineata (Ang.), pl. 15, fig. 9.

WESTERGARD, A. H. Studier öfver Dictyograptusskiffern och des Gränslager med Särskild, Hänsyn till Skåne Förekommande Bildnigar.—Lunds Geologiska Fältklubb, Ser. B, No. 4, 1909.

Fossil från acerocarenzonen.

Agnostus sp., p. 67, pl. 1, fig. 1.

Peltura corniger sp. nov., p. 48, pl. 1, fig. 2-4.

Parabolina heros Brögg., p. 48, pl. 1, fig. 5-8.

Boeckia? illaenopsis sp. nov., p. 49, pl. 1, fig. 14-15, 18, samt sannolikt 16, 17; *B. scanica* sp. nov., p. 50, pl. 1, fig. 9-13.

Euloma primordiale sp. nov., p. 51, pl. 1, fig. 21, 22.

Niobe primaeva sp. nov., p. 52, pl. 1, fig. 23. 24.

Megalaspis sp., p. 53, pl. 1, fig. 25; *M. sp.*, p. 54, pl. 1, fig. 26, 27.

Fossils från Dictyograptusskiffern & Oboluslagren.

Hysterolenus törnquisti Moberg, p. 54, pl. 2, g. 1-4; *H.? levicauda* Moberg, p. 58, pl. 1, fig. 5.

Boeckia mobergi Wiman, p. 55, pl. 2, fig. 6-9.

Acerocare sp., p. 55.

————Notiser Börande *Dictyograptus* Skiffern.—Geol. Förens. Förhandl., Bd. 39, 1917, pp. 635-644, plates 7.

Boeckia mobergi Wiman, p. 637, pl. 7, fig. 1-9.

Parabolinella wimani sp. nov., p. 639, pl. 7, fig. 10-17.

This new species takes the place of *Acerocare?* Wiman, Palaeont. Notizen 3-6, p. 82, pl. 5, fig. 15, and *Boeckia mobergi* Wiman, idem, p. 81, pl. 5, fig. 10.

————Sveriges Olenidskiffer.—Utbrening och Lagerföljd. 2 Fauna i Trilobita, pp. 115-205, plates 1-16, 1922.

Agnostus pisiformis (Linné), p. 115, pl. 1, fig. 1-3; *A. pisiformis obesus* Belt, p. 116, pl. 1, fig. 4a, b, (5, 6, ?); *A. cyclopyge* Tullberg, p. 116, pl. 1, fig. 7, 8; *A. reticulatus* Ang., p. 117, pl. 1, fig. 9, 10; *A. trisectus* Salter, p. 117, p. 1, fig. 11, 12; *A. rudis* Salter, p. 118, pl. 1, fig. 17; *A. rudis holmi* var. nov., p. 118, pl. 1, fig. 13-16.

Differs from the British *A. rudis* in greater convexity of the cephalon and a narrower margin of the tail. Compared with the Swedish form referred to this species, the tail has, moreover, a wider and longer axis.

Agnostus sp., p. 119, pl. 1, fig. 18.

Schmalenseeia amphionura Moberg, p. 119, pl. 1, fig. 19.

General form depressed, ovate; thorax seven segments; pygidium axis seven rings including the terminal portion.

Proceratopyge nathorsti sp. nov., p. 120, pl. 2, fig. 3-5.

Pygidium only known. Pygidium large, semicircular, with one pair of strong marginal spines; axis narrower than the lateral lobes, conical, divided by shallow, transverse furrows into three rings, and an elongated terminal portion, not reaching the margin; lateral lobes, with broad, flat limb, moderately convex; two pairs of distinct, and a third pair of indistinct grooves.

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WESTERGARD, A. H.—Continued.

Proceratopyge tullbergi sp. nov., p. 121, pl. 2, fig. 6, 7.

Differs from the pygidium of *P. nathorsti* in having a longer axis of six to seven rings in addition to the terminal portion, and a narrower, slightly arched marginal limb.

Liostracus pusillus sp. nov., p. 121, pl. 2, fig. 8-19.

Small form. Cephalon semicircular; genal angles pointed or spined; border rim wide, rather flat, separated by a narrow and shallow furrow; glabella wide, conical, almost truncate in front, not reaching to the intermarginal furrow; glabellar furrows three to four pairs in adult specimens, faintly marked, occipital furrow strong, curving forward at the axial line; occipital ring smooth?; palpebral lobe of moderate size, placed in the middle of the cheeks and at a distance from the glabella; palpebral ridges distinct, transverse; facial suture running backward and inward from the anterior margin to the eyes, thence outward and backward, cutting the posterior margin close to the genal angles; free cheeks narrow; thorax ten segments; axis convex; pleurae obliquely grooved, in their extremities sloping downward, probably pointed.

Pygidium of young specimens with rounded and entire margin; axis conical, reaching nearly to the margin, five to six rings; lateral lobe with four to five pairs of pleural grooves.

Liostracus (?) *superstes* Linnarsson, p. 122, pl. 2, fig. 20.

Conokephalina olenorum sp. nov., p. 122, pl. 1, fig. 22-26, (27 & 28?).

Cephalon semicircular; genal angles with long, curved spines; margin rim broad, flat; glabella subcylindrical, slightly tapering toward the front, not reaching to the intermarginal furrow; glabellar furrows indistinct; palperbral lobes curved, reaching in front and behind nearly to the glabella, and posteriorly to the occipital furrow; facial suture running inward, and backward from the anterior margin of the eye, thence outward; fixed cheeks narrow, forming a pointed, very small lobe behind the eye; free cheeks rather broad, aperture of eye large. A fragment of a thorax segment has grooved pleurae produced into a long, backward-directed spine.

Acrocephalites stenometopus (Ang.), p. 123, pl. 1, fig. 20, 21a-c.

Acrocephalites? rarus sp. nov., p. 123, fig. in text No. 39.

Fragment of cranidium.

Glabella rather convex, three pairs of shallow glabellar furrows, front limb in front of the glabella rather flat; fixed cheek swollen between the eye and the glabella and having a broad concavity running from the anterior part of the palpebral lobe to the anterior angle of the glabella; ocular ridge lacking; facial suture behind the eye directed outward and backward (half way from the eye, inward and backward). Test probably smooth.

Olenus gibbosus Wahl., p. 123, pl. 3, fig. 1-10; *O. transversus* Linrs., p. 125, pl. 3, fig. 11-17, (pl. 5, fig. 16, 17?); *O. truncatus* (Brün), p. 126, pl. 3, fig. 18, 19; pl. 5, fig. 1-4; *O. wahlenbergi* sp. nov., p. 128, pl. 4, fig. 5-14, the *Entm. gibbosus* Wahl. (pars), p. 39, pl. 1, fig. 4.

General form (exclusive of the free cheeks) elongated, subelliptical; glabella subrectangular, short, separated from the anterior marginal rim by a frontal limb of about a qaurter its own length; free cheeks broad, with large aperture of the eye; spine slightly deviating from the direct continuation of the external margin, and directed somewhat outward; thorax with fifteen to sixteen segments; axis convex, forming nearly one-third the total width in the anterior segment, and more than one-third the posterior segment; pleurae horizontal near the tips, bent downward, the first two pointed, the following ones produced into short spines which are longest on segments eight to ten.

Pygidium triangular; axis broad, conical, obtuse, reaching (nearly) to the margin, composed of five to six segments; lateral lobes far narrower than the axis, with two or three pairs of grooves, the ribs marked by a fine, intermediate line; margin entire.

Olenus attenuatus (Boeck), p. 128, pl. 4, fig. 15-19; pl. 5, fig. 1-9.

Olenus dentatus sp. nov., p. 130, pl. 5, fig. 10-15.

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Glabella approximately as broad as the fixed cheek at the posterior margin and separated from the anterior marginal rim by a frontal limb one-fifth to one-sixth of its length; palpebral lobes of moderate size, placed a little nearer to the anterior than posterior margin, and set at a distance from the glabella less than one-half the width of the latter; free cheeks of moderate width, the spine and posterior margin forming a right angle.

Thorax with twelve sebments; axis occupying one-third the total width; pleurae bent downward in the outer portion, grooved, ending in short spines.

Pygidium small, rounded in outline; rim narrow, with one pair of short spines; axis broader than the lateral lobes, strongly conical, not reaching to the margin, and consisting of three or four segments (including the terminal one); lateral lobes somewhat arched, with two pairs of groves, ribs with fine intermediate lines.

Olenus scanicus sp. nov., p. 131, pl. 6, fig. 6-8.

Cephalon like that of *O. rotundatus,* but differs in having smaller, and more anteriorly placed palpebral lobes.

Pygidium small, semicircular; axis with three rings (including the terminal one), conical, not reaching to the margin; lateral lobes with two pairs of backward-curved grooves, three pairs of border spines, the posterior pair rudimentary; marginal rim wanting.

Olenus rotundatus sp. nov., p. 131, pl. 6, fig. 1-5.

Cranidium: glabella subrectangular, forming one-fourth of the width of the cranidium at the posterior border; frontal limb at the axial line less than one-half the glabella in front; palpebral lobes rather small, placed somewhat forward and distant from the glabella, a little more than half the width of the latter.

Thorax segments unknown; axis forming less than one-third, and in the posterior segments about one-third of the total width, each ring bearing a median tubercle; pleurae bent somewhat downward in the front segments, horizontal in the posterior segments.

Pygidium semicircular, axis one-third of total width, conical, obtuse, composed of five or six segments, not extending to the border.

Lateral lobes with three or four pairs of backward curved grooves; border forming a narrow, raised rim with one pair of small spines.

Olenus sp., p. 132, pl. 6, fig. 25.

Parabolina brevispina sp. nov., p. 133, pl. 6, fig. 9-13.

Form depressed, elongate, ovate, the width of the thorax less than one-half the total length; glabella forming one-half the width of the cranidium at the posterior margin, narrowing towards the front, and reaching forward nearly to the border; occipital ring bearing an elongated median tubercle.

Thorax with twelve segments; axis one-half the total width, bearing a row of median tubercles; pleurae ending in short spines.

Pygidium small, composed of three segments with two pairs of short spines.

Parabolina spinulosa (Wahl.), p. 134, pl. 6, fig. 14-20.

Parabolina mobergi sp. nov., p. 135, pl. 6, fig. 21-24.

Cranidium trapezohedral, length one-half the width; glabella subcylindrical, with rounded anterior angles, not reaching the margin; glabellar furrows three pairs, the anterior short and faintly marked, the posterior meeting across the glabella; occipital ring with a strong, backward-directed spine; palpebral lobes rather small, at a distance from the glabella of a little more than one-half the width of the latter; palpebral ridges straight, running at right angles to the axis; facial suture curving backward from the anterior margin to the eye, thence outward and backward to the posterior border, which it cuts some distance within the genal angle; free cheeks broad; genal angles long and broad, deviating slightly from the direct continuation of the external marginal rim.

Pygidium semicircular; axis slightly conical, with five rings (including the terminal portion), reaching to the marginal rim; lateral lobes slightly arched, with three to four pairs of grooves, the ribs with fine intermediate lines;

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border forming a very narrow rim with three pairs of short spines, the last rudimentary.

Parabolina longicornis sp. nov., p. 136, pl. 7, fig. 1-8.

Form rather depressed, ovate; glabella tapering slightly forward, truncate orbroadly rounded in front; glabellar furrows three pairs; occipital ring with median tubercle or spine; fixed cheeks behind the eyes expanded and wider than the glabella; palpebral lobes moderate, placed in the middle of the cheek, distant from the glabella by one-half the width of the latter; palpebral ridges distinct, transverse or slightly oblique; frontal limb varying somewhat in breadth in front of the glabella; facial suture behind the eye running nearly at right angles to the axis, finally curving backward; eyes large; genal spines long and slender.

Thorax of twelve segments; axis one-fourth the width, each ring bearing a median tubercle; pleurae at their extremities bent slightly downward, ending in spines, the spines of the eighth segment being very long; pleural grooves continued in the base of the spines.

Pygidium broad and short, rounded in outline, with a flat and rather broad marginal rim, and three pairs of broad, short spines directed backward and inward; axis narrow, somewhat conical, blunt, reaching nearly to the rim; lateral lobes with three pairs of grooves.

Parabolina acanthura (Ang.), p. 137, pl. 7, fig. 9-16, p. 198, same figures; *P. megalops* Moberg & Möller, p. 137, pl. 7, fig. 17-23; *P. heros* Brögg., p. 137, pl. 7, fig. 24-34.

Parabolina jemtlandica sp. nov., p. 138, pl. 7, fig. 35-38.

Fragments only.

Cranidium moderately arched, somewhat convex in front; glabella slightly conical, rounded in front; glabellar furrows three pairs, not meeting in the dorsal furrow; occipital ring with median tubercle; fixed cheek, at the posterior margin, equal in width to the glabella, half that width at the eye; palpebral lobes small, placed far forward; palpebral ridges transverse; frontal limb at the axial line somewhat broader than the frontal rim; genal angles strong and straight, in direct continuation of the outer margin.

Thorax with median tubercle and deeply grooved pleaurae, which, at their extremities, are bent somewhat downward and end in spines.

Pygidium semicircular, axis forming about one-third the whole width, somewhat conical, blunt, not reaching the margin, having three rings, the two anterior bearing a median tubercle, the third confluent with the terminal portion; lateral lobes with three pairs of faintly marked grooves, the ribs with intermediate lines; marginal spines four, the last rudimentary and placed behind the axis.

Parabolinella laticauda sp. nov., p. 139, pl. 8, fig. 1-7.

Cephalon semicircular, moderately arched, margin formed by a narrow, raised rim; glabella subrectangular, slightly tapering forward, broadly rounded in front, separated from the frontal rim by a broad frontal limb; oblique glabellar furrows three pairs, the anterior indistinct, all obsolete at the dorsal furrows, and not reaching to the axial line; dorsal furrows at the side of the glabella distinct and faintly marked in front of it; facial suture curved from the anterior margin backward and slightly inward to the eye, thence outward and backward, cutting the posterior margin somewhat more than one-half way out. In some thorax segments the axis is narrower than the pleurae, each ring bearing a small median tubercle; pleurae bent slightly downward one-half way out from the dorsal furrows, grooved, ending in short spines.

Pygidium broad, short, rounded in outline or somewhat truncate behind the axis; axis forming less than one-third the total width, slightly conical, blunt, reaching to the marginal rim, and having two rings besides the terminal portion; lateral lobes marked by three grooves, the ribs with a fine intermediate line; border forming a flat rim without spines.

Beltella solitaria sp. nov., pl. 14, fig. 1, 2.

From a flattened internal cast.

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Cephalon semicircular, border forming a rather flat rim, genal angles produced into backward-directed and outward-curved spines; glabella slightly conical, broadly rounded in front, with two to three pairs of faintly marked glabellar furrows, the last meeting the axial line; occipital furrow distinct; occipital ring with a small tubercle; fixed cheek at the posterior margin narrower than the glabella; palpebral lobes small, placed far forward; palpebral ridge indistinct; frontal limb at the axial line as broad as at the marginal rim; facial sture at the front of the eye directed forward and outward.

Thorax with twelve segments, decreasing in width from the sixth; axis forming more than one-third of the total width in the anterior segments and about one-third of the total width in the posterior segments; pleurae half way out bent downward and ending in broad, short spines.

Pygidium with three pairs of border spines.

Leptoplastus raphidophorus Angelin, p. 143, pl. 8, fig. 13-17; pl. 10, fig. 2, 3; *L. ovatus* Ang., p. 145, pl. 8, fig. 18-21.

Leptoplastus minor sp. nov., p. 144, pl. 8, fig. 25-29; fragments only known. Distinguished from *L. raphidophorus* by the shortness of the genal spines and smaller size.

Leptoplastus paucisegmentatus sp. nov., p. 146, pl. 8, fig. 22, (23, 24?).

Related to *L. ovatus*. It differs in having nine thoracic segments and the free cheek referred doubtfully to it being narrower and longer than in the latter species.

Leptoplastus stenotus Angelin, p. 146, pl. 9, fig. 1-6; *L. claudicans* (Moberg & Möller), p. 147, pl. 8, fig. 8-12.

Eurycare latum (Boeck), p. 148, pl. 9, fig. 7-10; *E. brevicauda* Ang., p. 148, pl. 9, fig. 11, 12.

Eurycare spinigerum sp. nov., p. 149, pl. 9, fig. 13, 14; pl. 10, fig. 1.

Cranidium resembling that of *E. brevicauda*.

Thorax having twelve segments, the axis ring of the eleventh segment sending out a long spine, the other rings smooth or bearing very faint tubercles.

Surycare angustatum Ang., p. 150, pl. 10, fig. 4-9.

Ctenopyge neglecta sp. nov., p. 150, pl. 10, fig. 10-18.

Glabella forming less than one-third the width of the cranidium at the posterior border, tapering slightly forward, and not reaching to the intermarginal furrow; glabellar furrows three pairs, faint, oblique, the anterior indistinct, the posterior reaching nearly, if not quite to the axial line; occipital ring with median spine; palpebral lobes moderate, placed at an equal distance from the anterior and posterior border and the glabella; palpebral ridges distinct, very slightly oblique, frontal limb varying in breadth from one-half to twice the width of the arched frontal rim; facial sutures meeting in a point at the axial line on the upper surface of the broad frontal rim; free cheeks wide, arched, bent slightly upward at the genal angles, ornamented with branching and anastomosing ridges which radiate from the eyes, long and broad, curved inward and, at their extremities, downward.

Thorax with at least ten segments, axis in the anterior and middle segments narrower than the pleurae, each axial ring bearing a median spine which, in the anterior segment is short, in the ninth and tenth segments very long; pleurae horizintal, bent slightly downward near the tips, produced in slender curved spines which are shorter in the first segments, but in the following segments seem to be as long as, or longer, than the width of the pleurae.

Pygidium, doubtfully referred, very small and semicircular; axis broad, consisting of two rings and the terminal portions; lateral lobes with two pairs of rudimentary spines.

Ctenopyge flagelifera (Angelin), p. 152, pl. 10, fig. 19-23; pl. 11, fig. 1.

Ctenopyge flagellifera angusta var. nov., p. 153, pl. 11, fig. 2-8.

Differs from the typical form in having the dorsal shield proportionally narrower, the axis broader, more backward placed, the cheek spines less curved.

Ctenopyge spectabilis Brögger, p. 154, pl. 11, fig. 9-14.

Ctenopyge tumida sp. nov., p. 155, pl. 11, fig. 15-20.

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Ctenopyge? sp. indet. Linnarsson, 1880, pl. 6, fig. 15.

Cranidium slightly emarginate in front, frontal border forming a narrow, raised rim; glabella somewhat conical, rather truncate in front, with three pairs of glabellar furrows, the first obsolete, the last usually meeting across the glabella, but shallow towards the axial line; occipital ring with a small median spine; fixed cheeks arched, much wider than the glabella at their posterior border; palpebral lobes moderate, placed a very little nearer to the anterior than to the posterior margin, and at a distance from the glabella somewhat less than the width of the latter; palpebral ridges transverse or slightly obique; facial suture directed outward behind the eye, cuting the border at some distance in front of the rounded posterior angle; free cheeks small, sloping gently from the eye to the margin, angulate in outline, spine broad and long, placed backward.

Number of segments of the thorax unknown; axis a little wider than the pleurae, each ring bearing a median spine; pleurae in the outer, anterior portion swollen, produced into long, slender, curved spines, the spines of the first segment being especially long and strongly curved.

Pygidium unknown.

Ctenopyge erecta sp. nov., p. 156, pl. 11, fig. 21-27.

Fragments.

Cranidium broad, its width two and a half times its length, emarginate in front; frontal rim strongly erect; glabella narrow, forming one-fifth of the total width of the cranidium at the posterior border, subcylindrical, reaching nearly, if not quite, to the marginal furrow; glabellar furrows two to three pairs, the anterior two of which are obsolete, the last meeting across the glabella, but very faint towards the axial line; palpebral lobes placed a very little nearer to the posterior than the anterior margin, and at a distance from the glabella equal to the width of the latter; palpebral ridges oblique; facial suture behind the eye running at right angles to the axis; free cheeks broad, with faint vascular markings radiating from the eye, margin uniformly curved; eyes large, semispherical; cheek spines slender, slightly curved, placed backward; the associated hypostoma lingulate, posteriorly somewhat expanded.

Thorax wider than the cephalon, number of segments unknown; axis forming less than one-fifth of the whole width, probably bearing (in the first anterior segment) a row of median tubercles; pleurae straight, horizontal, bent slightly downward at the tips, deeply grooved, produced into spines which, in the anterior segments, are short.

Pygidium unknown.

Ctenopyge affinis sp. nov., p. 157, pl. 12, fig. 1-14, (15?).

This species agrees most nearly with *C. bisulcatus*.

The free cheek, with its angular outline, backward-placed and not very curved spine, and the shape of the fixed cheek, which is nearly horizontal and acute at the posterior border, have impelled the author to make a separate species.

Ctenopyge oelandica sp. nov., p. 158, pl. 12, fig. 18.

Fragment.

Nearly related to *C. directa*, from which it is distinguished in having a straight front, the eyes placed near to the posterior border, with very oblique palpebral ridges.

Ctenopyge directa Lake, p. 158, pl. 12, fig. 16, (17?); *C. bisulcata* (Phillips), p. 159, pl. 12, fig. 19-25; *C. teretifrons* (Angelin) p. 162, pl. 13, fig. 6, (7, 9.?); *C. pecten* Salter p. 160, pl. 12, fig. 26-33; pl. 13, fig. 1.

Ctenopyge linnarssoni sp. nov., p. 162, pl. 13, fig. 2-5.

Cranidium.

Nearly related to *Ctenopyge teretifrons* but differs in having the glabella slightly tapering towards the front and the fixed cheeks narrower.

Sphaerophthalmus major Lake, p. 163, pl. 13, fig. 9-18, (19?); *S. alatus*

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(Boeck), p. 165, pl. 13, fig. 20-29; *S. majusculus* Linnarsson, p. 166, pl. 13, fig. 30-35.

Peltura scarabaeoides (Wahl.), p. 168, pl. 15, fig. 2.

Protopeltura praecursor (Westergärd), *P. acanthura* Brögger.

Dorsal shield moderately arched.

Cephalon semicircular, genal angles angulate and produced into spines which are nearly, if not quite, direct continuations of the external margin; glabella moderately broad, not reaching to the frontal rim; eyes small, rather close to the glabella and frontal border; palpebral ridges distinct.

Axis of the thorax slightly conical, about equal in width to the pleurae; pleurae produced into spines.

Pygidium small, wide, entire or dentated.

Acerocare ecorne Angelin, p. 168.

Cyclognathus micropygus Linrs., p. 169.

Protopeltura aciculata (Angelin), p. 169, pl. 14, fig. 3-12, (13?); *P. aciculata pusilla* var. nov., p. 171, pl. 14, fig. 14-17.

A small form distinguished from *P. aciculata* by its subrectangular glabella, wider free cheeks, wider, and somewhat triangular pygidium.

Protopeltura intermedia sp. nov., p. 171, pl. 14, fig. 18-22.

Cranidium, free cheek and pygidium known.

Glabella forming nearly one-half the width of the cranidium at the posterior border, rounded anteriorly, with two pairs of distinct glabellar furrows; occipital ring bearing a slightly developed median tubercle; frontal limb somewhat narrower than the frontal rim; palpebral lobes placed close to the glabella.

Pygidium small, broadly semicircular; axis one-third the whole width, with two rings and the terminal portion not extending to the border; lateral lobes arched, with two pairs of grooves; border forming a narrow, flat, entire rim, which is somewhat elevated towards the median line.

Protopeltura praecursor (Westergärd), p. 171, pl. 14, fig. 23-29, (30?); pl. 15, fig. 1.

Peltura scarabaeoides acutidens Brögger, p. 175, pl. 15, fig. 14-17.

Peltura minor (Brögger), p. 175, pl. 15, fig. 3-11.

Peltura cornigera Westergärd, p. 176, pl. 15, fig. 15, 19-23.

Glabella extending nearly, if not quite, to the very faintly marked frontal rim; glabellar furrows obsolete; occipital furrow shallow; occipital ring broad and flat, with a very slightly developed median tubercle; palpebral ridges indistinct; facial suture curved strongly inward near the posterior border; free cheek narrow, bearing a short spine, which is set far back and projects at right angles to the margin.

Thorax segments unknown; axis strongly convex, bearing a row of very faint median tubercles; pleurae strongly arched, with fulcrum close to the dorsal furrow and terminating in very short spines.

Pygidium semi-circular; axis occupying a little more than one-third of the width and composed of two distinctly separate rings and the terminal portion, extending to the marginal rim; lateral lobes arched, with two pairs of well marked grooves; border forming a narrow, rather flat rim with three pairs of small, blunt spines.

Peltura paradoxa (Moberg & Möller), p. 177, pl. 16, fig. 1-4, 5?; *P. coltata* (Brögger)? p. 177, (*Cyclognathus costatus* Bögg.).

Acerocare ecorne Angelin, p. 178, pl. 16, fig. 6-14; *A. tullbergi* Moberg & Möller, p. 178, pl. 16, fig. 15-18.

Cyclognathus micropygus Linrs.., p. 178, pl. 16, fig. 19-25; *C. granulatus* (Moberg & Möller), p. 179, pl. 16, fig. 26-32, the *Acerocare granulatum* (pars) Moberg & Möller, 1898, pl. XI, fig. 1-9 (e) & pl. 14, fig. 1-5.

Boeckia scanica Westergard, p. 179, pl. 16, fig. 40-43; *B.? illaenopsis* Westergärd, p. 179, pl. 16, fig. 33-39.

Euloma primordiale Westergärd, p. 180, pl. 2, fig. 21, 22.

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WESTERGARD, A. H.—Continued.

Only fragment known.

Niobe primaeva Westergärd, p. 180, pl. 2, fig. 23, (24, 25, 26?).

Some rare fragments of Asaphidae, the oldest of this family from Sweden, are found in the *Acerocare zone* in Scania, and in the *Parabolina longicornis* sub-zone at Kinnekulle Hill (Westergötland). Two cranidia seem to belong to *Niobe;* two hypostomata to *Megalaspis,* the generic reference of the other fragments being doubtful.

Orusia lenticularis; Zone 3, *Parabolina spinulosa* & *Orusia lenticularis,* p. 182, (the *Orthis lenticularis* Wahl.), has a special brachiopod facies. It occurs, however, very often together with *Parabolina spinulosa,* especially in the shales.

Notes:

The species mentioned by Brögger under the name *Protopeltura acanthura,* and occurring in Norway at the bottom of the *Peltura* zone, is not, as was believed, identical with the Swedish *Praabolina acanthura,* but a new species to which Westergärd gave the name *Peltura praecursor* in 1909.

The species quoted by Brögger from the Norwegian *Ceratopyge* limestone under the name *Cyclognathus micropygus* is not the same as Linnarsson's species, but quite a new species which Moberg & Möller have named *Acerocare norvegicum.*

(Moberg, Hist. Stratigraphical Review of the Silurian of Sweden, p. 172.)

WILSON, ALICE E. & MATHER, KIRTLEY, F. Synopsis of the Common Fossils of the Kingston Area.—25th Ann. Rep., Ontario Bur. of Mines, 1916, pp. 45-66, pl. 1-3.

Synoptic List of the Black River species.

Crustacea:

Bathyurus sp. Ulrich; *B. extans* (Hall); *B. springer* Hall.

Bumastus milleri (Billings); *Ceraurus pleurexanthemus* Green; *Illaenus sp.; Isotelus gigas* DeKay; *Onchometopus simplex* R. & N.; *Pterygometopus sp.*

Ostracoda:

Aparchites sp.; Eurychilina sp.; Isochilina subarmata Ul.; *Leperditella* cf. *nundala* Ulrich; *L. tumida* Ul.; *L. fabulites* (Conrad).

Key to Black River Fossils.

Trilobites:

Descriptions of the above listed genera and species.

Ostracoda:

Descriptions of the above listed genera and species.

Synoptic list of Trenton Possils.

Trilobites:

Isotelus gigas DeKay; *Bumastus* sp.; *Calymene senaria* Conrad; *Ceraurus dentatus* R. & N.; *C. pleurexanthemus* Green.

Descriptive Key of Trenton Fossils.

Trilobites:

Order Opisthoparia.

Fam. Asaphidae: *Isotelus, Isotelus gigas* DeKay.

Fam. Illaenidae: *Bumastus, B. billingsi* R. & N.; *B. bellevillensis* R. & N.

Order Proparia.

Fam. Calymenidae, *Calymene senaria* Conrad.

Fam. Cheiruridae, *Cheirurus pleurexanthemus* Green; *C. dentatus* R. & N.

WIMAN, CARL. Palaeontologische Notizen, 3-6.—Bull. Geol. Inst. of Upsala, No. 11, Vol. 6, Part 1, 1902, pp. 77-83, pl. 3.

3. Ueber *Robergia microphthalma* Linrs. und *Triarthrus jemtlandicus* Linrs.
4. *Paradoxides jemtlandicus* sp. nov.

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5. Ein neuer Trilobit in Dicyomemaschiefer, *Boeckia mobergi* sp. nov. (Referred by Westergärd in 1917 to *Parabolinella wimani*, p. 81, pl. 5, fig. 9, 11-14, (e) 10/1.)

————Palaeontologische Notizen, 7-12.—Bull. Geol. Inst. of Upsala, Vol. 7, 1905, pp. 287-296, pl. 29-30.

7. Uber das Exsulans lager auf Oland.

Paradoxides tessini Brong.; *Ellipsocephalus muticus* Ang.

8. *Diaphanometopus lineatus* Ang.

9. *Pliomera linnarssoni* sp. nov.

10. *Ueber Holometopus* Angelin.

11. *Anomocare excavatum* Ang.

12. Ein Problematicum.

————Ueber die Fauna des Westbaltischen Leptaenakalks.—Arkiv. för Zoologi, Bd. 3, No. 24, 1907, pp. 20, pl. 2.

Die Fauna Trilobiten.

Cheirurus tenuispinus Törnquist.

Pseudosphaerexochus conformis Ang.; *P.* sp.

Deiphon punctatus Ang.

Acidaspis sp.

Calymene sp.

Procyus sp.

Illaenus sp.

Ampyx sp.

Dicellocephalus? leptaenarum sp. nov.

————Iakttagelser på *Nilus armadillo* Dalman.—Geol. Fören. Förhandl., No. 225, Bd. 26, Häft 1, p. 87, 5 fig. in text.

WOODS, HENRY. The Cambridge Nat. Hist., Vol. 4, 1920, Chapter VIII, pp. 221-252, fig. in text 136, 151.

Classification of Trilobites into sixteen families

Fam. 1. Agnostidae; Genera *Agnostus, Microdiscus.*

Fam. 2. Shumardiidae; Genus *Shumardia.*

Fam. 3. Trinucleidae; Genera *Orometopus*, p. 230, fig. 140a, *Ampyx*, p. 230, fig. 140c, *Trinucleus*, p. 230, fig. 140b, *Dionide.*

Fam. 4. Harpedidae; Genus *Harpes*, p. 248, fig. 150a.

Fam. 5. Paradoxidae; Genera *Olenellus, Holmia*, p. 246, fig. 148, *Mesonacis, Olenelloides*, p. 247, fig. 149, *Paradoxides*, p. 246, fig. 147, *Zacanthoides, Centropleura, (Anopolenus)*,—*Remopleurides*, p. 248, fig. 150d. This genus probably belongs to a separate family. (Miller, 1889, placed it under *Remopleuridae.*)

Fam. 6. Conocephalidae (Conocoryphidae); Genera *Conocoryphe*, p. 248, fig. 150e, *Atops, Ctenotephalus, Bathynotus.*

Fam. 7. Olenidae; Genera *Ptychoparia, Angelina*, p. 248, fig. 150h, *Solenopleura*, Sao, p. 239, fig. 143, *Agraulos (Arionellus), Ellipsocephalus*, p. 248, fig. 150b, *Protolenus, Olenus*, p. 248, fig. 150c, *Peltura, Acerocare, Eurycare, Ctenopyge, Leptoplastus, Triarthrus*, p. 237, fig. 142a, b, *Parabolina, Sphaerophthalmus, Parabolinella, Ceratopyge* (position doubtful),—*Dikelocephalus*, perhaps belongs to a distinct family. (Miller, 1889, placed it under Dicellocephalidae.)

Fam. 8. *Calymenidae;* Genera *Calymene*, p. 244, fig. 137, *Synhomalonotus, Homalonotus*, p. 228, fig. 136.

Fam. 9. Asaphidae; Genera *Asaphus*, (Subgen. *Megalaspis*), *Adaphellus, Symphysurus*, &c., *Ogygia ,Barrandia, Niobe, Nileus, Illaenus*, p. 248, fig. 150f,

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WOODS, HENRY.—Continued.

Bumastus, Stygina.—Aeglina is usually placed in this family, but its systematic position is doubtful.

Fam. 10. Bronteidae; Genus *Bronteus.*

Fam. 11. Phacopidae; Genera *Phacops,* p. 227, fig. 138, and p. 248, fig. 150i, *Trimerocephalus, Acaste, Pterygometopus, Chasmops, Dalmanites, Cryphaeus.*

Fam. 12. Cheiruridae; Genera *Cheirurus, Deiphon,* p. 250, fig. 151c, *Placoparia, Sphaerexochus, Amphion, Staurocephalus.*

Fam. 13. Proetidae; Genera *Proetus,* p. 248, fig. 150g, *Arethusina,* p. 250, fig. 151b, *Cyphaspis, Phillipsia,* p. 250, fig. 151a, *Griffithides, Brachymetopus, Dechenella.*

Fam. 14. Encrinuridae; Genera *Encrinurus, Cybele, Dindymene.*

Fam. 15. Acidaspidae; Genus *Acidaspis,* p. 250, fig. 151f.

Fam. 16. Lichidae; Genera *Lichas* (subgen. *Arges*), *Dicranogmus, Conolichas, Ceratolichas.*

The author remarks that many genera are not included in this classification and a few are preoccupied for other genera in Natural History.

————Eurypterida.—The Cambridge Nat. Hist., Vol. IV, 1920, pp. 283-294, figs. in text.

The genera and species included in this paper are *Eurypterus fischeri* fig. 161, 162, *Pterygotus osiliensis,* fig. 164, *Slimonia acuminata,* fig. 165, *S. laconus,* fig. 166.

The genera *Hughmilleria, Dolichopterus, Eusarcus* and *Strabops* are noted but not described.

The author remarks, p. 294, "The Eurypterids are distinguished from the Scorpions by the much greater development of the last pair of legs. The large metastomia of the former is homologous with the sternum of the Scorpion. The genital operculum is much smaller in Scorpions than in Eurypterids, and in this respect the latter agree with *Thelyphemus* (one of the Pedipalpi), more than the Scorpions."

WOODWARD, HENRY. On a Carboniferous Trilobite from Angran in Nidderale, York.—Trans. Leeds Geol. Assoc., Part XIV, 1909, pp. 10-12.

ZITTEL, A. VON. Grundzüge der Palaeontologie (Palaeozoologie).—Reworked by F. Broili, Part Invertebrata, 5th Edition.

Order 4. Phyllopoda:

Palaeozoic; *Protocaris* Walc., *Ribeiria* Sharp, *Ribeirella* Schub., *Notostraca* Walc., *Naraoia* Walc., fig. 1308, *Burgessia* Walc., *Waptia* Walc., fig. 1309.

Branchipodidae; *Anostraca* Calman, *Opabinia* Walc., *Leanchoilia* Walc., *Yohoia* Walc., *Bidentia* Walc., *Rochdalia* Woodw., *Branchiopodites vectenis* Woodw.

Estheriidae; *Estheria* Rüpp, fig. 1310, *Leaia* Jones, *Estheriella* Weiss, *Schizodiscus* Clarke, *Beyrichona, Hipponicharion, Bradoria, Aluta* Matthew, *Polyphyma* Greem.

Order 5. Trilobita:

Fam. 1. Mesonacidae Walcott, (Olenellidae Moberg); *Mesonacis* Walc., *Elliptocephala* Emmons, *Olenellus* Hall, *Olenelloides* Peach & Horne, *Holmia* Matthew, fig. 1324, *Callavia* Matt., *Peachella* Walc., *Paedeumias* Walc., *Kjerulfia* Kiaer, *Paradoxides* Brong., *Metadoxides* Bornem., *Hydrocephalus* Barr., *Oryctocephalus* Walc., *Acanthoides* Walc., *Olenoides* Meek, *Dorypyge* Dames, *Damesella* Walc., *Neolenus* Matth., *Redlichia* Cossman, *Olenopsis* Bornem., *Vanuxemella* Walc., *Hanburia, Tsinania* Walc.? *Remopleurides* Portlock.

Fam. 2. Olenidae Burmeister; *Olenus* Dalm., *Acerocare* Ang., *Eurycare* Ang., *Ctenopyge* Linrs., *Leptoplastus* Ang., *Teinistion* Monke, *Blackwelderia* Walc., *Marjumia* Walc., *Lisania* Walc., *Ptychoparia* Corda, *Liostracus* Ang., *Solenopleura* Ang., *Hicksia* Delg., *Hystricurus* Raym., *Sao* Barr., *Euloma* Ang.,

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Bavarilla Barr., *Protolenus* Matth., *Palaeolenus* Mansuy, *Agraulos* Corda, *Plethopeltis* Raym., *Inouyia* Walc., *Shantungia* Walc., *Triarthrus* Green, *Peltura* Milne Edw., *Drepanura* Berg., *Stephanocare* Monke, *Ellipsocephalus* Zenker, *Parabolina* Salter, *Parabolinella* Brög., *Parabolinopsis* Hock.,? *Micmacca Matth.*, Norwoodidae, *Norwoodia* Walcott.

Fam. 3. Conocoryphidae Angelin; *Conocoryphe* Corda, (*Conocephalites* Barr., *Atops* Emm., *Bailiella* Matth.), *Ctenocephalus* Corda, *Alocistocare* Lorenz, *Acrocephalites* Wallerius, *Eryx* Ang., *Carausia* Hicks, *Bathynotus* Hall,? *Carmon* Barr., *Shumardia* Bill., *Menomonidae,—Menomonia,* Millardia, *Dresbachia* Walc.

Fam. 4. Ceratopygidae Raymond: *Albertella* Walc., *Ceratopyge* Corda., *Crepicephalus* Owen.? *Lonchocephalus* Owen, *Saratogia* Walcott, *W'anneria* Walcott.

Fam. 5. Corynexochidae Angelin-Walcott: *Corynexochus* Ang., (*Karlia* Walcott), *Bathyuriscus* Meek, *Dolichometopus* Ang.

Fam. 6. Dicellocephalidae Miller; *Dikelocephalus* Owen, *Dikelokephalina* Brögger, *Bathyurus* Bill., *Petigurus* Raym., *Platycolpus* Raymond; *Proampyx* Frech,? *Pagodia, Lisania, Chuangia* Walc.? *Solenopleura* Ang., *Menocephalus* Owen, *Levisia, Anomocarella* Walc.,? *Coosia, Saukia,* Walc., *Calvinella, Osceolia* Walc., *Ptychaspis* Hall., *Holocephalina* Salter,? *Anomocare* Ang.,

Fam. 7. Agnostidae Dalman: *Agnostus* Brong., *Goniodiscus* Raym.,? *Mollisonia* Walc., *Eodiscus* Matth., *Pagetia* Walc.

Fam. 8. Trinucleidae Salter:? *Orometopus* Ang., *Trinucleus* Llwyd, (*Cryptolithus* Green), *Ampyx* Dalm., (*Lonchodonus Raphiophorus* Ang.), *Dionide* Barr., *Endymionia* Bill.

Fam. 9. Harpedidae Barrande: *Harpes* Goldf., (*Eoharpes* Raym.,) *?Harpides* Beyr.

Fam. 10. Asaphidae Emmrich: *Ogygopsis* Walc., *Orria* Walc., *Asaphiscus* Meek, *Blountia, Maryvillia* Walc., *Niobe* Ang., *Barrandia* McCoy, *Megalaspis* Ang., *Ogygia* Brong., (*Ogygites* T. & Lebec), *Asaphus* Brong., *Ptychopyge* Ang., *Pseudasaphus* Schm., *Megalaspides* Brög., *Basilicus* Salter, *Brachyaspis* Salter, *Isotelus* DeKay, *Holasaphus* Matth., *Onchometopus* Schm., *Asaphellus* Callw., *Hemigyraspis* Raym., *Cryptonymus* Eich., *Symphysurus* Goldf., *Nileus* Dalm., *Aeglina* Barr., *Telephus* Barr.

Fam. 11. Illaenidae Corda: *Illaenurus* Hall, *Illaenus* Dalm., (Subgenera: *Octillaenus, Panderia* Salter, *Dysplanus* Burm., *Ectillaenus* Salt., *Illaenopsis* Salt.), *Bumastus* Murch., *Stygina, Psilocephalus* Salt., *Thaleops* Conrad,? *Giordanella* Bornem.

Fam. 12. Calymenidae Brongniart; *Calymene* Brong., *Pharostoma* Corda, *Synhomalonotus* Pomj., *Homalonotus,* (Subgenera *Brongniartia, Koenigia, Burmeisteria* Salter, *Trimerus, Dipleura* Green, *Calymenella* Bergeron).

Fam., 13. Proetidae Barrande: *Arethusina* Barr., *Phillipsinella* Novák, *Cyphaspis* Burm., *Haploconus* Raymond, *Proetus* Steininger, (*Drevermannia*), *Cyrtocymbole,* Richter, *Typhloproetus* Frech-Richter, *Euproetus* Richter, *Tropidocoryphe* Novák. *Astycoryphe* Richter, *Pteroparia, Skemmatopyge* Richter, *Dechenella* Kayser, (Subgen. *Eudechenella, Basidechenella, Paradechenella* Richter), *Schizoproetus* Richter, *Phillipsia* Portlock, *Griffithides* Portl., *Pseudophillipsia* Gemm., *Brachymetopus* McCoy.

Fam. 14. Bronteidae Barrande: *Bronteus* Goldfuss, (*Goldius* DeKoninck), *Thysanopeltis* Corda, *Bronetopsis* N. & Eth.

Fam. 15. Cheiruridae Salter: *Cheirurus* Beyr., *Ceraurus* Green, *Cyrtometopus, Sphaerocoryphe* Ang., *Crotalacephalus* Salter, *Pseudosphaerexochus, Nieszkowskia* Schm., *Deiphon* Barr., *Placoparia* Corda, *Areia* Barr., *Sphaerexochus* Beyr., *Amphion* Pander, *Staurocephalus* Barr., *Pliomera* Ang., *Diaphanometopus* Schm., *Youngia* Lindstr. Burlingidae—*Burlingia* Walc., *Schmalenseeia* Moberg.

Fam. 16. Encrinuridae Linnarsson: *Cybele* Lovén, *Cybeloides* Slocum, *Dindymene* Corda, *Encrinurus* Emm., *Cromus* Barr.

Fam. 17. Acidaspidae Barrande: *Acidaspis* Murchison, (*Odontopleura* Emm.) (Subgen. *Selenopeltis* Corda, *Leonaspis, Primaspis, Miraspis, Radiaspis*

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ZITTEL, A. VON.—Continued.

Pseudomonaspis Richter, *Ceratocephala* Warder, *Dicranurus* Conrad, *Ancyropyge* Clarke), *Glaphurus* Raym.

Fam. 18. Lichadidae Corda: *Lichus* Dalman. (Subgen. *Protolichas, Deuterolichas* Reed, *Arges* Goldf., *Corydocephalus* Corda, *Amphilichas* Raym., *Conolichas* Dames, *Acanthopyge, Dicranopeltis* Corda, *Homolichas* Schmidt, *Eiflarges* Richter, *Arctinurus* Castelnau, &c.) (*Uralichas*) *ribeiroi* Delg.

Fam. 19. Phacopidae Salter: *Phacops* Emm., *Trimerocephalus* McCoy, *Reedia* Wedekind, *Acaste* Goldf., (*Phacopidella* Reed), *Pterygometopus* Schm., *Dalmania* Emm., (Subgen. *Dalmanitina* Reed, *Hausmannia* Hall & Clarke) *Dalmanites* Barr., *Glockeria, Denkmannites* Wedekind, *Odontocephalus* Conrad, *Cryphaeus* Green, *Calmonia, Pennaia, Proboloides* Clarke.

Malacostraca:

Archaeostoma Stromer.

Hymenocaridae: *Hymenocaris* Salter, *Hurdia, Tuzoia, Odaria, Fieldia, Carnarvonia* Walc.

Ceratiocaridae: *Ceratiocaris* McCoy, *Caryocaris* Salter, *Sinocaris* Mansuy, *Phasganocaris* Novák, *Acanthocaris* Peach, *Macrocaris* Miller.

Echinocaridae; *Echinocaris* Whitfield, *Pephricaris* Clarke, *Aristozoe* Barr., (*Bactropus* Barr.), *Ptychocaris* Novák, *Tropidocaris* Beecher, *Emmelezoe* J. & W.

Rhinocaridae: *Rhinocaris* Clarke, *Mesothyra* Hall & Clarke,? *Dithyrocaris* Scouler.

Discinocaridae: *Discinocaris* Woodw., *Dipterocaris* Clarke, *Aspidocaris* Reuss, *Aptychopsis* Barr., *Peltocaris* Salter.

Order 2. Syncarida Packard & Calman.

Palaeocaris M. & W., *Gampsonyx* Jordan, (*Uronectes* Bronn).

Order 3. Schizopoda, Spaltfüsser: *Anthrapalaemon* M. & W., *Pseudogalathea, Tealliocaris, Palaemysis,* Peach, *Anthrapalaemon* Salt., *Palaeopalaemon* Whitfield.

Brachyura: *Gitocrangon* Ritcher, *Brachyopyge* Woodward.

Class 2. Merostomata Woodward.

Order 1. Limulava Walcott.

Sidneyidae: *Sidneyia* Walc., *Amiella* Walc.

Order 2. Gigantostraca Haekel.

Eurypteridae: *Strabops* Beecher, *Eurypterus* DeKay, *Onchopterus* C. & R., *Tylopterus* C. & R., *Megalograptus* Miller, *Stylonurus* Page, *Dolichopterus* Hall, *Eusarcus* Grote & Pitt, (*Drepanopterus* Laurie, *Eurysoma* Claypole), *Echinognathus* Walc., *Anthraconectes* M. & W., *?Adelophthalmus* Jordan & H. von Meyer, *?Eurypterella* Matth., *?Beltina* Walc., *Slimonia* Page, (*Himantopterus* Salter).

Pterygotidae: *Pterygotus* Ag., *Erettopterus* H. & S., *Hughmilleria* Sarle, *Glyptoscorpius* Peach, *Hastimima* White.

Order 3. Xiphosura.

Fam. 1. Bellinuridae Packard: *Belinurus* Koenig, *Prestwichia* Woodward, (*Euproops* M. & W.), *Protolimulus* Pack., *Prolimulus* Fritsch, *Halicyne* von Mayer.

Fam. 2. Aglapsidae Clarke: *Aglapsis* Hall.

Fam. 3. Hemiaspidae Zittel: *Bunodes* Eichw., (*Exapinurus* Nieszk.) *Hemiaspis* Woodw., *Neolimulus* Woodw., *Pseudoniscus* Niezk., *Bunodella* Matth.

Entomostraca:

Order 2. Cirripedia.

Fam. 1. Lepidocoleidae Clarke: *Lepidocoleus* Faber, *Anatifopsis* Barr.

Fam. 2. Turrilepadidae Clarke: *Turrilepas* Woodward, *Strobilepis* Clarke.

Order 3. Ostracoda.

Leperdita Rouault, *Isochilina* Jones, *Leperditella* Ulr., *Schmidtella* Ulrich, *Paraparchites* Ulr. & Bassl., *Beyrichia* McCoy, *Primitia* Jones, *Dicranella* Ulrich, *Primitiella* Ulr., *Ulrichia* Jones., *Eurichilina* Ulr., *Jonesella* Ulr., *Bollia* Jones & Holl., *Tetradella* Ulr., *Ceratopsis* Ulr., *Kloedenia* J. & H., *Kirkbya* Jones, *Aeschmina* J. & H.

Cytheridae: *Cythere* Müller, *Cythereis* Jones, *Cytheridea* Bosq., *Carbonaria* Jones, *Thlipsura* J. & H., *Octonaria* Jones.

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PART II.

AN ALPHABETICAL LIST OF THE GENERA AND SUB-GENERA OF THE TRILOBITA.

ACANTHALOMA Conrad, 1840. See *Ceratocephala* Warder.

ACANTHEUS Angelin, 1854. (Corrected to *Aneucanthus,* q. v.)

ACANTHOCNEMIS Corda, 1847. See *Sao.*

ACANTHOGRAMMA Corda, 1847. See *Sao.*

ACANTHOLENUS Matthew, 1898. 1 sp. Upper Cambrian.
Genotype *Leptoplastus spriniger* Matthew.

ACANTHOPLEURELLA Groom, 1902. 1 sp.
Genotype *A. grindrodi.*

ACASTE Goldfuss, 1843. 29 sp.
Genotype *Phacops dowingiae* Murchison.

ACEROCARE Angelin, 1878. 8 sp., 1 var. Fam. Olenidae. Cambrian.
Genotype *A. ecorne* Angelin.

ACIDASPIS Murchison, 1839. 118 sp. Fam. Acidaspidae. Ordovician, (Silurian, Devonian.)
Genotype *A. brightii* Murchison.

ACRECTOPYGE Corda, 1847. See *Cybele.*

ACROCEPHALITES Wallerius, 1895. 11 sp. Cambrian.
Genotype *A. stenometopa* Angelin.

ACROLICHAS Foerste, 1920. 12 sp. Ordovician.
Genotype *Lichas cucullus* Meek and Worthen.

ACTINOPELTIS Corda, 1847. 5 sp. Ordovician.
Genotype *A. corali-alexandri* Corda.

AEGLINA Barrande, 1852. 25 sp. 1 var. Fam. Aeglinidae Gürich. Ordovician.
Genotype *Egle rediviva* Barrande.
Cyclopyge has priority over Aeglina.

AGNOSTUS Brongniart, 1822. 107 sp., 9 var. Fam. Agnostidae. Cambrian, Ordovician.
Genotype *Entomolithus paradoxus pisiformis* Linnè.

AGRAULOS Corda, 1847. 49 sp. credited; probably too many. Cambrian.
Genotype *Arion ceticephalus* Barrande.

ALBERTELLA Walcott, 1908. 5 sp. Cambrian.
Genotype *A. helena* Walcott.

ALCESTE Corda 1847. See *Illaenus.*

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ALOKISTOCARE Lorenz, 1906. 7 sp. Cambrian.
Genotype *Ptychoparia subcoronata* Hall & Whitfield.

AMPHILICHAS Raymond, 1905. 12 sp. Ordovician.
Genotype *Platymetopus lineatus* Angelin.

AMPHION Pander, 1830. See *Pliomera.*

AMPHITRYON Corda, 1847. See *Remopleurides.*

AMPHOTON Lorenz, 1906. See *Dolichometopus.*

AMPYX Dalman, 1826. 61 sp., 2 var. Fam. Trinucleidae. Ordovician, Silurian.
Genotype *A. nasutus.*

AMPYXINA Ulrich. Ordovician.
Genotype *A. bassleri.*

ANACHEIRURUS Reed, 1896. 1 sp. Fam. Cheiruridae. Upper Tremadoc.
Genotype *Cheirurus* (*Eccoptochile*) *frederici* Salter.

ANCYROPYGE Clarke, 1892. Fam. Enrinuridae. Devonican.
Genotype *Acidaspis* (*Ancyropyge*) *romingeri.*

ANEUCANTHUS Angelin, 1852. Cambrian.
Genotype *Acantheus acutangulus* Angelin.

ANGELINA Salter, 1859. 5 sp. Cambrian.
Genotype *A. sedgwicki* Salter.

ANISONOTUS Raymond, 1920. 1 sp. Ordovician.
Genotype *Shumardia glacialis* Billings.

ANITOPYGE Girty, 1908. 2 sp. Permian.
Genotype *Phillipsia perannulata* Shumard.

ANOMOCARE Angelin, 1854. 30 sp. Fam. Olenidae. Cambrian.
Genotype *A. laeve* Angelin.

ANOMOCARELA Walcott,1905. 23 sp. Middle Cambrian.
Genotype *A. chinesis* Walcott.

ANOPOCARE Angelin, 1854.=*Peltura.*

ANOPOLENUS Salter, 1864. = *Centropleura.*

ANTHES Goldfuss, 1843. = *Peltura.*

ANTHRACOPELTIS Boulay, 1880. 1 sp. Devonian?
Genotype *A. crepini* Boulay.

APATOKEPHALUS Brögger, 1896. 9 sp., 1 var. Cambrian.
Genotype *Trilobites serratus* Boeck.

ARCHEGONUS Burmeister, 1843. Carboniferous.
Genotype *Calymene aequalis* von Meyer.
Burmeister used this genus for *Phillipsia* and *Griffithides.*

ARCTINURUS Castelnau, 1843. 5 sp. Ordovician.
Genotype *Paradoxides boltoni.*

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AREIA Barrande, 1852. 3 sp. Fam. Encrinuridae. Ordovician.
Genotype *A. bohemica* Barrande.

ARETHUSA Barrande, 1846. See *Aulacopleura* Corda, 1847.

ARETHUSINA Barrande, 1858.=*Aulacopleura.*

ARGES Goldfuss, 1839, preoccupied. See *Ceratarges.*

ARION Barrande. See *Agraulos* Corda.

ARIONELLUS Barrande, 1850. See *Agroulos* Corda.

ARRAPHUS Angelin. = *Harpes.*

ARTHRICOCEPHALUS Bergeron, 1899. Cambrian.
Genotype *A. chauveaui* Bergeron.

ARTHRORHACHIS Corda, 1847.
Genotype *Agnostus tardus* Barrande.

ASAPHELINA Munier, Chalmas and Bergeron, 1889. 2 sp. Ordovician.
Genotype *A. miqueli B...* (Selected by Brögger.)

ASAPHELLUS Callaway, 1877. 7 sp., 1 var. Upper Tremadoc.
Genotype *A. homfrayi.*

ASAPHISCUS Meek, 1873. 12 sp. Cambrian.
Genotype *A. wheeleri* Meek.

ASAPHUS Brongniart, 1822. About 86 sp., 8 var. Fam. Asaphidae. Ordovician.
Genotype *Entomolithus paradoxus expansus* Linné.

ASPIODOLITES Conrad. See *Dalmanites.*

ASTEROPYGE Corda, 1847. = *Dalmanites.*

ASTYCORYPHE Rud. and E. Richter, 1919. 6 sp. Devonian.
Genotype *A. senckenbergiana.*

ATOPS Emmons, 1844. Cambrian.
Genotype *A. trilineatus* Emmons.

AULACOPLEURA Corda, 1845. 9 sp. For *Arethusa* Barrande, preoccupied. Ordovician, Devonian.
Genotype *Arethusa konincki* Barrande.

AVALONIA Walcott, 1898. 3 sp.
Genotype *A. manuelensis* Walcott.

BAILIELLA Matthew, 1884. 2 sp. Cambrian.
Genotype *Conocephalites baileyi* Hartt.

BARRANDIA Hall, = *Mesonacis* and *Olenellus.*

BARRANDIA McCoy, 1849. 7 sp. Ordovician.
Genotype *Ogygia portlocki* Salter, = *Homalopteon.*

BASIDECHENELLA Richter. 3 sp. Devonian.
Genotype *Dechenella* (*Basidechenella*) *kayseri.*

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BASILICUS Salter, 1849. 14 sp. Ordovician.
Genotype *Asaphus tyrannus* Murchison.

BATHYNOTUS Hall, 1860. 1 sp. Cambrian.
Genotype *Peltura* (*Olenus*) *holopyga* Hall, the *Paradoxides quadrispinosus* Emmons, 1860.

BATHYURELLUS Billings, 1865. 13 sp. Ordovician.
Genotype *B. abruptus* Billings.

BATHYURISCUS Meek, 1873. 18 sp. Cambrian.
Genotype *Bathyurus? haydeni* Meek.

BATHYURUS Billings, 1859. 24 sp. Ordovician.
Genotype *Asaphus extans* Hall.
About fifty species have been referred to this genus, of which twenty-six are probably erroneous.

BAVARILLA Barrande, 1868. 1 sp. Cambrian.
Genotype *B. hofensis* Barrande.

BELTELLA Lake, 1919. 4 sp. Cambrian.
Ellipsocephalus depressus Salter.

BERGERONIA Matthew, 1895. 3 sp. Cambrian.
Genotype *Protolenus elegans* Matthew.

BLACKWELDERIA Walcott, 1906. 3 sp. Cambrian.
Genotype *Calymene? sinensis* Bergeron.

BLAINIA Walcott, 1916. 4 sp. Cambrian.
Genotype *Asaphiscus* (*Blainia*) *gregarius* Walcott.

BLOUNTIA Walcott, 1916. 17 sp. Cambrian.
Genotype *B. minula* Walcott.

BOECKIA Brögger, 1882. 4 sp. Cambrian.
Genotype *B. hirsuta* Brögger.

BOHEMILLA Barrande, 1872. 3 sp. 1 mutation. Ordovician.
Genotype *B. stupenda.*=*Aeglina.*

BOLBOCEPHALUS Whitfield, 1890. 2 sp. Ordovician.
Genotype *Bathyurus seelyi* Whitfield.

BORNEMANNIA Walcott, 1908. No description. Cambrian.
Genotype *B. prima* Walcott.

BOUNYONGIA Etheridge & Mitchell, 1917. 1 sp. Silurian.
Genotype *Ceratocephala* (*Bounyongia*) *bowningemsis.*

BRACHYAMPYX Forbes, 1849. See *Ampyx nudus.*

BRACHYASPIS Salter, 1866. 4 sp. Ordovician.
Genotype *Isotelus rectifrons* Portlock.

BRACHYMETOPINA Reed, 1893. 8 sp. Carboniferous.
Genotype *B. strzeleckii.*

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BRACHYMETOPUS McCoy, 1847. 10 sp. Carboniferous.
Genotype *Phillipsia maccoyi.*

BRACHYPLEURA Angelin, 1852. 2 sp. Fam. Remopleuridae. Ordovician.
Genotype *B. sexlineata.*

BRONGNIARTELLA Reed, 1918. 6 sp. Ordovician.
Genotype *Homalonotus* (*Brongniartella*) *bisulcatus.*

BRONGNIARTIA Eaton, 1832, not of Leach, 1824.=*Homalonotus.*

BRONTEOPSIS Wyville Thompson, 1857. 2 sp. Fam. Asaphidae. Ordovician.
Genotype *B. scotica* Salter.

BRONTEUS *Goldfuss,* 1839.= *Goldius.*

BUMASTUS Murchison, 1839. 34 sp. Fam. Bumastidae. Ordovician. Silurian.
Genotype *Bumastus barriensis* Murchison.

BURLINGIA Walcott, 1908. 1 sp. Cambrian.
Genotype *B. hectori* Walcott.

BURMEISTERELLA Reed, 1918. 5 sp. Lower Devonian.
Genotype *Homalonotus* (*Burmeisterella*) *elongatus.*

BURMEISTERIA Salter, 1865. 9 sp. Fam. Calymenidae. Devonian.
Genotype *Homalonotus herschelii.*

CAINATOPS Matthew, 1899. 1 sp. Cambrian.
Genotype *Conocoryphe pustulosus* Matthew.

CALLAVIA Matthew, 1897. 9 sp. Cambrian.
Genotype *Olenellus* (*Holmia*) *bröggeri* Walcott.

CALMONIA Clarke. 5 sp. Devonian.
Genotype *C. signifer.*

CALVINELLA Walcott, 1914. 4 sp. Upper Cambrian.
Genotype *Dikelocephalus spiniger* Hall.

CALYMENE *Brongniart,* 1822. 58 sp. Fam. Calymenidae. Silurian, Devonian.
Genotype *Trilobus tuberculatus* Bronn.

CALYMENELLA Bergeron, 1890. 2 sp. Ordovician.
Genotype *C. boselli* Bergeron.

CALYMENOPSIS Munier, Chalmers & Bergeron. 1 sp. Cambrian.
Genotype *C. filacovi.*

CAPHYRA Barrande, 1846. 3 sp. Ordovician.
Genotype *C. radians* Barrande.

CARAUSIA Hicks, 1872. 1 sp. Cambrian.
Genotype *C. menevensis* Hicks.

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CARMON, Barrande, 1872. 1 sp. Cambrian.
Genotype *Trilobites mutilus* Barrande.

CATADOXIDES Matthew, 1899. Subg. of *Metadoxides,* Cambrian.
Genotype *M. magnificus* Matthew.

CELMUS Angelin, 1854. 1 sp. Ordovician.
Genotype *C. granulatus* Angelin.

CENTROPLEURA Angelin, 1854. 13 sp. 11 species of *Anopolenus* are included. Cambrian.
Genotype *paradoxides lovéni.*

CEPHALOCANTHUS Lapworth, 1888, not of Lacepede, 1802.=*Callavia* and *Holmia.*

CERATARGES Gürich, 1901.
Genotype *Arges armatus* Goldfuss.

CERATOCEPHALA Warder, 1838. 37 sp. Fam. Acidaspidae. Silurian.
Genotype *C. goniata* Warder.

CERATOLICHAS Hall & Clarke, 1888. 3 sp. Fam. Lichadidae. Lower Devonian.
Genotype *C. gryps.*

CERATOPYGE Corda, 1847. 4 sp. and vars. Fam. Ceratopygidae Raymond. Cambrian.
Genotype *C. forficula* Sars.

CERAURINUS Barton, 1913. 11 sp. Upper Ordovician.
Genotype *C. marginatus* Barton.

CERAURUS Green, 1832. 24 sp. Fam. Cheiruridae. Ordovician.
Genotype *C. pleuraxanthemus.*

CHARIOCEPHALUS Hall., 1863. 1 sp. Cambrian.
Genotype *C. whitfieldi* Hall.

CHASMOPS McCoy, 1849. 32 sp. 2 var. Ordovician.
Genotype *Calymene odini* Eichwald.

CHAUNOPROETUS Rud. & E. Richter. Devonian.
Genotype *Proetus* (*Chaunoproetus*) *palensis.*

CHEILOCEPHALUS Berkey, 1898. 1 sp. Cambrian.
Genotype *C. st. croixensis* Berkey.

CHEIROPYGE Diemer, 1897. 1 sp. Carboniferous.
Genotype *C. himalayensis.*

CHEIRURUS Beyrich, 1845. 22 sp. Ordovician, Silurian
Genotype *C. exsul* Beyrich.

CHONDROPARIA Lorenz, 1906. 1 sp. Cambrian.
Genotype *Agraulos pusillus* Matthew.

CHUANGIA Walcott, 1911. 4 sp. Cambrian.
Genotype *Ptychoparia? batia* Walcott.

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CLELANDIA Crossman, 1902. 1 sp. Replaces *Harrisia* Cleland, 1903, preoccupied. Ordovician.
Genotype *Harrisia parabola* Cleland.

COLYMBUS Hadding, 1913. 1 sp. Ordovician.
Genotype *C. lovisae.*

CONASPIS Hall, 1863. 15 sp. Cambrian.
Genotype *Conocephalites perseus* Hall.

CONDYLOPYGE Corda, 1847.
Genotype *Battus rex* Barrande.

CONIOPLEURA Corda, 1847. See *Cyphaspis.*

CONOCEPHALITES Barrande, 1852. For Preoccupied *Conocephalus* and *Trigonocephalus* Zenker, 1833. = Various forms in many genera.

CONOCEPHALUS Zenker, 1833. See *Conocephalites.*

CONOCORYPHE Corda, 1847, 34 sp. Fam. Conocoryphidae. Cambrian.
Genotype *Trilobites sulzeri* Schlotheim.

CONOKEPHALINA Brögger, 1886. 8 sp. Cambrian.
Genotype *Conocephalites ornatus* Brögger.

CONOLICHAS Dames, 1888. 7 sp. Devonian.
Genotype *Lichas aequilobus* Steinhardt.

CONOPARIA Corda, 1847. 2 sp. Barrande referred this to *Cyphaspis.* It contains species with twelve thoracic segments. Devonian.
Genotype *Cyphaspis barrandei.*

CONOPHRYS Callaway, 1874. See *Shumardia.*

COOSIA Walcott, 1911. 6 sp. Cambrian.
Genotype *C. superba* Walcott.

CORDANIA Clarke, 8 sp. Devonian.
Genotype *Phaethonides cyclurus.*

CORNUPROETUS Rud. & E. Richter, 1919. Devonian.
Genotype *Proetus* (*Cornuproetus*) *senckenbergianus.*

CORONURA Hall & Clarke, 1888. 3 sp. Devonian.
Genotype *C. aspectans* (Conrad).

CORYCEPHALUS Hall & Clarke. 3 sp. Devonian.
Genotype *C. regalis.*

CORYDOCEPHALUS Corda, 1847. 17 sp. Silurian.
Genotype *C. flabellatus* Corda = *C. palmatus* Barrande.

CORYNEXOCHUS Angelin, 1854. 10 sp. Fam. Corynexochidae. Cambrian.
Genotype *C. spinulosus* Angelin.

Subgenus: *Bonnia* Walcott. 3 sp. Cambrian.
Genotype *Corynexochus parvulus* Billings.

CRASPEDARGES Gürich, 1901.
Genotype *C. wilcanniae.*

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CREPICEPHALUS Owen, 1852. 33 sp. Cambrian.
Genotype *Dicellocephalus iowensis* Owen.

CRITHIAS Corda, 1847. See Sao.

CROMUS Barrande, 1852. 6 sp. Referred to Encrinurus.

CROSSOURA Moberg & Segerberg, 1906. 2 sp. Ordovician.
Genotype *C. parvula* Mauds.

CROTALOCEPHALUS Salter, 1853. 10 sp. Silurian, Devonian.
Genotype *Calymene articulata* Münster.

CROTALURUS Volborth. 1 sp. Ordovician.
Genotype *C. barrandei.*

CRYPHAEUS Green, 1837, preoccupied in Coleoptera. See *Asteropyge* Corda.

CRYPHINA Oehlert, 1889. 1 sp. Devonian.
Genotype *C. andegavensis.*

CRYPTOLITHUS Green, 1832, (for *Trinucleus*). 61 sp. Ordovician.
Genotype *C. tesselatus* Green.

CRYPTONYMUS Eichwald, 1825, see *Asaphus* (4 sp.) and *Illaenus* (4 sp.)

CRYPTONYMUS Eichwald, 1840, see *Encrinurus* (6 sp.).

CTENOCEPHALUS Corda, 1847, 7 sp., 3 var. Cambrian.
Genotype *C. barrandei* Corda.

CTENOPYGE Linnarsson, 1880, 17 sp. Cambrian.
Genotype *Olenus* (*Sphaerophthalmus*) *pecten* Salter.

CYBELE Lovén, 1845. 28 sp. Ordovician.
Genotype *Calymene bellatula* Dalman.

CYRELOIDES Slocum, 1913. 6 sp. Ordovician.
Genotype *C. iowensis* Slocum.

CYCLOGNATHUS Linnarsson, 1875. 5 sp. 1 var. Cambrian.
Genotype *C. micropygus* Linnarsson.
Moberg and Möller hold this genus to be a synonym of *Acerocare.*

CYCLOPYGE Corda, 1847. 25 sp., 1 var. See *Aeglina.*

CYLINDRASPIS Sandberger, 1856. 2 sp. Devonian.
Genotype *C. latispinosa.*
Kayser referred *Phillipsia aequalis* to it; Richter referred *Cylindraspis macrophthalma* to *Euproetus.*

CYLINDROCEPHALUS Trinker, preoccupied.

CYPHASPIDES Novak, 1890. 5 sp. Devonian.
Genotype *C. Scuticauda.*

CYPHASPIS Burmeister, 1843. 77 sp. Ordovician, Silurian, Devonian.
Genotype *Phacops ceratophthalmus* Goldfuss.

CYPHONISCUS Salter, 1852. Cambrian.
Genotype *C. socialis* Salter.

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CYRTOMETOPUS Angelin, 1852, 12 sp., 1 var. Fam. Cheiruridae. Ordovician.
Genotype *Calymene elavifrons* Dalman.

CYRTOSYMBOLE Richter, 1913, 11 sp. Devonian.

DALMANIA Emmrich, 1844. Preoccupied. Ordovician, Silurian, Devonian.

DALMANITES Barrande, 1852. 10 sp., 10 var. For *Dalmania* preoccupied.
Genotype *Trilobus caudatus* Bronn.

DALMANITINA Reed, 1908. 11 sp., 1 var. Ordovician, Silurian.
Genotype *Dalmanites socialis* Barrande.

DAMESELLA Walcott, 1905. 3 sp. Cambrian.
Genotype *D. blackwelderi* Walcott.

DAWSONIA Matthew = *Goniodiscus*.

DECHENELLA Kayser, 1880. 29 sp. Devonian.
Genotype *Trilobites verticalis* Burmeister, 1843.
Subgenera:
BASIDECHENELLA Richter, 1912. 4 sp.
EUDECHENELLA Richter, 1912. 19 sp.
EUDECHENELLA Richter, 1912. 19 sp.
PARADECHENELLA Richter, 1912. 1 sp.

DEIPHON Barrande, 1850. 4 sp. Silurian.
Genotype *D. forbesi* Barrande.

DENCKMANNIA Wedekind, 1914. 2 sp. Devonian.
Genotype *Phacops volborthi* Barrande.

DEUCALION Stschegloff, 1827.
The author proposed *Deucalion* for two species now known as *Nileus armadillo* and *Illaenus crassicauda*.

DIAPHANOMETOPUS Schmidt, 181. 1 sp. Fam. Cheiruridae. Ordovician.
Genotype *D. volborthi* Schmidt.

DICHAGNOSTUS Jaekel, 1891. See *Pleuroctenium*.

DICRANACTIS Corda, 1847. See *Bronteus*.

DICRANOGMUS Corda, 1847. 3 sp. Silurian.
Genotype *Lichas simplex* Barrande.
Gürich, 1901, proposed *Liparges* for Corda's genus. Reed placed it under *Corydocephalus*.

DICRANOPELTIS Corda, 1847. 9 sp. Ordovician, Silurian.
Genotype *Lichas scaber* Beyrich.
Dr. Gürich proposed *Trachylichas* for Corda's genus, which Reed placed under *Dicranopeltis* with 5 species.

DICRANURUS Conrad, 1841. 4 sp. Devonian.
Genotype *D. hamatus*.

DICTYOCEPHALITES Bergeron, 1895. Cambrian.
Genotype *D. villerbruni*, referred to *Dikelokephalina* by Brögger.

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DIGOMUS Gürch. 7 sp. Devonian.
Genotype *Homalonotus gigas* Roemer.

DIKELOKEPHALINA Brögger. 6 sp. Cambrian.
Genotype *D. dicraeura* Angelin.

DIKELOCEPHALUS Owen, 1852. Fam. Dicellocephalidae Miller. 21 sp. Ordovician.
Genotype *D. minnesotensis* Owen.

DINDYMENE Corda. 1847. 11 sp. Ordovican.
Genotype *D. frederici-augusti* Corda.

DINESUS Etheridge, 1896. 1 sp. Cambrian.
Genotype *D. ida* Etheridge.

DIONE Barrande, 1847. See *Dionide* Barrande, 1847, and *Polytomurus* Corda, 1847.

DIONIDE Barrande, 1847. 10 sp. Ordovician.
Genotype *D. formosa.*

DIPLAGNOSTUS Jaekel, 1901.
Genotype *Agnostus planicauda* Angelin.

DIPLEURA Green, 1832. 6 sp. Devonian.
Genotype *D. dekayi* Green.

DIPLORRHINA Corda, 1847. See *Peronopsis.*

DOLICHOMETOPUS Angelin, 1854. 16 sp. Cambrian.
Genotype *D. svecicus* Angelin.

DORYPYGE Dames, 1883, 22 sp. 4 var. Cambrian.
Genotype *D. richthofeni* Dames.

DORYPYGELLA Walcott, 1905. 2 sp. = *Teinistion* Monke.

DREPANURA Bergeron, 1899. 2 sp. Cambrian.
Genotype *D. premesnili* Bergeron.
Woodward compares the pygidium with *Bathynotus.*

DRESBACHIA Walcott, 1916. 1 sp. Cambrian.
Genotype *D. amata* Walcott.

DREVERMANNIA Richter, 1913. 7 sp. Devonian.
Genotype *D. schmidti.*

DYSPLANUS Burmeister, 1843. 17 sp. Silurian.
Genotype *Asaphus centrotus* Dalman.

EBENEZERIA Marcou, 1888. = *Elliptocephala.*

ECCONCHOECIA Moberg, 1895. 1 sp. Cambrian.
Genotype *E. mucronata.*

ECCOPTOCHILE Corda, 1847. 12 sp. Ordovician.
Genotype *Cheirurus claviger* Beyrich.

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ECHINOLICHAS Gürich, 1901. 1 sp. Devonian.
Genotype *Lichas eriopsis* Hall.

ECTENASPIS Raymond, 1920. 2 sp. Ordovician.
Genotype *Megalaspis beckeri* Slocum.

ECTENOTUS Raymond, 1920. 2 sp. Ordovician.
Genotype *Amphion westoni* Billings.

ECTILLAENUS Salter, 1867. 2 sp. Ordovician.
Genotype *Illaenus* (*Ectillaenus*) *perovalis* (Murchison.)
Raymond, 1916, remarks, "The genus should be dropped."

EGLE Barrande, 1846. See *Aeglina* and *Cyclopyge*.

EIFLIARGES Richter, 1917. Devonian.
Genotype *Lichas* (*Eifliarges*) *caudimirus*.

ELLIPSOCEPHALUS Zenker, 1833. 1 sp. Cambrian.
Genotype *Trilobites hoffi* Schlotheim.

ELLIPTOCEPHALA Emmons, 1844. 1 sp. Cambrian.
Genotype *E. asaphoides* Emmons.

ELYX Angelin, 1852. 2 sp. = *Ctenocephalus*.

EMBOLINUS Roeminger, 1887. = *Zacanthoides*.

EMMRICHELLA Walcott, 1911. 5 sp. Cambrian.
Genotype *Ptychoparia theana* Walcott.

ENCRINURUS Emmrich, 1844. 51 sp. Ordovician, Silurian.
Genotype *Trilobus punctatus* Brunn.

ENDOGRAMMA Corda, 1847. See Sao.

ENDYMION Billings, changed to *Endymionia*.

ENDYMIONIA Billings, 1862. 2 sp. Fam. Edymionidae Raymond. Ordovician.
Genotype *E. meeki* Billings.

ENNEACNEMIS Corda, 1847. See *Sao*.

EOCORYNE *Matthew*, 1886.
Genotype *E. gonium* Matthew.

EODISCUS Matthew, 1896. Cambrian.
Genotype *Microdiscus schucherti* Matthew.

EOHARPES Raymond, 1903. To replace *Harpina*, preoccupied. 10 sp. Ordovician.
Genotype *Harpina prima* Barrande.

EOHOMALONOTUS Reed, 1918. To replace *Brogniartia*, preoccupied. 14 sp. Ordovician.
Genotype *Homalonotus* (*Echomalonotus*) *brongniarti* Desl.

ERINNYS Salter, 1856. 4 sp. Not of Schranck 1801. = *Bailiella*.

EUARGES Gürich, 1901. 2 sp. = *Corydocephalus*.

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EUDECHANELLA Richter, 1912. 10 sp. Subgenus of *Dechenella*. Devonian.
Genotype *Phillipsia verneuili* Barrande.

EULOMA Angelin, 1854. 9 sp. Cambrian.
Genotype *E. laeve* Angelin.

EUPROETUS Richter, 1913. 5 sp. Devonian.
Genotype *Proetus* (*Euproetus*) *bivalletus*.

EURYCARE Angelin, 1854. 5 sp. Cambrian.
Genotype *E. brevicauda* Angelin.

EURYMETOPUS Postlethwaite & Goodchild, 1886. 2 sp. Ordovician.
Genotype *E. cumbrianus* P. & G.

EUTRIMEROCEPHALUS Gortani, 1907. A subdivision of *Trimerocephalus*. Devonian.
Genotype *Trinucleus laevis* Münster.

FIALOIDES Hadding, 1914. 1 sp. A cranidium figured which might be compared with *Amphoton steinmanni* Lorenz. Ordovician.
Genotype *F. antiquatus*.

FORBESIA McCoy, 1846. Preoccupied. Silurian (Upper Ludlow).
Genotype *F. latifrons*.

FRAMMIA Holtedahl, 1914.
Genotype *F. dissimilis*.

GENIACANTHUS Corda, 1847. See *Sao*.

GENIOPLEURA Corda, 1847. See *Cyphaspis*.

GEORGIELLUS Moberg, 1899. = *Elliptocephala*. Cambrian.

GERASAPHUS Clarke, 1894. 1 sp. Ordovician.
Genotype *G. ulrichiand* Clarke.

GERASTOS Goldfuss, 1843. 7 sp. = *Proetus*. Devonian.

GIORDANELLA Bornemann, 1891. 3 sp. Cambrian.
Genotype *Illaenus meneghinii* Bornemann.

GLAPHURUS Raymond, 1905. 1 sp. Ordovician.
Genotype *Arionellus pustulatus* Wallcott.

GLOCKERIA Wedekind, 1914, 3 sp. Devonian.
Genotype *G. glockeri* Barrande.
Mclearn, 1918, referred it to *Phacopina* Reed, 1905.

GOLDIUS DeKoninck, 1841. 131 sp. Ordovician, Devonian.
Genotype *G. flabellifer*.

GONIODISCUS Raymond, 1896. Cambrian.
Genotype *Agnostus lobatus* Hall.

GONIURUS Raymond, 1913, 4 sp. Ordovician.
Genotype *Bathyurus perspicator* Billings.

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GRIFITHIDES Portlock, 1843. 53 sp. Carboniferous.
Genotype *G. globiceps;* no genotype published.

HANBURIA Walcott, 1 sp. Cambrian.
Genotype *H. gloriosa* Walcott.

HAPLOCONUS Raymond, 1913. 3 sp. Ordovician.
Genotype *Bathyurus smithi* Billings.

HARPES Goldfuss, 1839. 30 sp. Fam. Harpeidae Corda. Ordovician 10 sp., Silurian 14 sp., Devonian 6 sp.
Genotype *Trilobites ungula* Sternberg.

HARPIDELLA McCoy. See *Cyphaspis.*

HARPIDES Beyrich. 1846. 8 sp. Ordovician.
Genotype *H. hospes* Beyrich.

HARPINA Novak. See *Eoharpes.* 1 sp.

HARRISIA Cleland. 1sp. Ordovician.
Referred to *Clelandia* by Crossman.

HARTSHILLIA Illing, 1915.
Genotype *Holocephaleria inflata* Hicks.

HARTTELLA Matthew, 1885. Cambrian.
Genotype *Conocephalites matthewi* Hartt.

HARTTIA Walcott, 1884. Cambrian.
Genotpye *H. matthewi* Walcott.

HAUSMANNIA Hall & Clarke. 4 sp. Devonian.
Genotype *Dalmanites* (*Hausmannia*) *caudatus.*

HEILOPROETUS Rud. & E. Richter. 3 sp. Devonian.
Genotype *Proetus* (*Heiloproetus*) *ebersdorfensis.*

HELIOMERA Raymond, 1905. 1 sp. Ordovician.
Genotype *Cheirurus sol* Billings.

HEMIARGES Gürich. 1 sp. Ordovician.
Genotype *Lichas wesenbergensis* Schmidt.

HEMICRYPTURUS Green. See *Asaphus expansus* and *Calymene clintoni.*

HEMIGYRASPIS Raymond, 1918. 8 sp. Ordovician.
Genotype *Isotelus affinis* McCoy.

HEMISPHAEROCORYPHE Reed, 1896. 3 sp. Ordovician.
Genotype *Sphaerexochus pseudohemicranium* Nieszk.

HERSE Corda, 1847. = *Agraulos* Corda.

HICKSIA Delgado 1904. 9 sp. Cambrian.
Genotype *H. elvensis* Delgado.

HOEFERIA Redlich, 1901. = *Redlichia.*

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HOLASAPHUS Matthew, 1895. 7 sp. Cambrian.
Genotype *H. centropyge* Matthew.

HOLEMERIS Corda, 1847. See *Bronteus*.

HOLMIA Matthew, 1890. 4 sp. Cambrian.
Genotype *Paradoxides kjerulfi* Linrs.

HOLOCEPHALINA Salter, 1864. 2 sp. Cambrian.
Genotype *H. primordialis* Salter.

HOLOMETOPUS Angelin 1854. 8 sp. Ordovician.
Genotype *H. limbatus* Angelin.

HOLOTRACHELLUS Linnarsson mss., Holm, 1898. = *Illaenus*.

HOMALONOTUS Koenig, 1825. Ordovician, Silurian, Devonian.
Genotype *H. knighti* Koenig.

HOMALOPS Remele, 1855, = *Phacops*.

HOMALOPTEON Salter, 1866. 3 sp. Subgenus of *Barrandia*. Ordovician.
Genotype *Ogygia portlocki* Salter.

HOMOGLOSSA Raymond, 1912. 1 sp. Ordovician.
Genotype *Ogygia dilatata panderi* Schmidt.

HOMOLICHAS Schmidt, 1885. 6 sp. Ordovician.
Genotype *Lichas depressus* Angelin.

HOMOTELUS Raymond, 1920. 7 sp. Ordovician.
Genotype *H. ulrichi*.
Derived from *Isotelus* for species partly referred to *Onchometopus*.

HOPLOLICHAS Dames, 1872. 10 sp. & var. Ordovician, Silurian.
Genotype *Lichas tricuspidatus* Beyrich.

HOUSIA Walcott, 1916. 1 sp. Cambrian.
Genotype *Dolichometopus* (Housia) varro Walcott.

HUNGIA Walcott, 1913. Ozarkian.
Genotype *H. billingsi* Walcott.

HYBOASPIS Raymond, 1920. 1 sp. Ordovician.
Genotype *H. shuleri* Raymond.

HYDROCEPHALUS Barrande, 1846. 2 sp. = *Paradoxides*.

HYDROLENUS Salter, 1866. Ordovician.
Genotype *Illaenus* (*Hydrolenus*) *conifrons*. Raymond, 1916, remarks that the genotype belongs to the older genus *Thaleops*, therefore the genus should be dropped.

HYPAGNOSTUS Jaekel, 1909. Cambrian.
Genotype *Agnostus parvifrons* Linnarsson.

HYSTEROLENUS Moberg, 1898. 2 sp. Cambrian.
Genotype *H. törnquisti* Moberg.

HYSTRICURUS Raymond, 1913. 4 sp. Ordovician.
Genotype *Bathyurus conicus* Billings.

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ILLAENOIDES Weller, 1903. 2 sp. Silurian.
Genotype *I. trilobus* Weller.

ILLAENOPSIS Salter, 1866. 2 sp. Ordovician (Lower Llandeilo).
Genotype *I. thompsoni* Salter.

ILLAENURUS Hall, 1863. 9 sp. Upper Cambrian and Early Ordovician.
Genotype *I. quadratus* Hall.

ILLAENUS Dalman, 1826. 125 sp. Cambrian, Ordovician, Silurian.
Genotype *Entomostracites crassicauda* Wahlenberg.

INOUYIA Walcott, 1911. 10 sp. Cambrian.
Genotype *Agraulos? capax* Walcott.

ISOCOLUS Angelin, 1854. Ordovician.
Genotype *I. sjögreni* Angelin. A blind genus incompletely known.

ISOTELOIDES Raymond, 1910. 4 sp. Fam. Asapridae. Ordovician.
Genotype *Isotelus whitfieldi* Raymond.

ISOTELUS DeKay, 1824. 29 sp., 1 var. Fam. Asaphidae. Ordovican.
Genotype *I. gigas* DeKay.

JONOTUS von Meyer. See *Harpes*. Devonian.

KARLIA Walcott. See *Corynexochus*. 2 sp.

KAWINA Barton, 1915. 5 sp. Ordovician.
Genotype *Cheirurus vulcanus* Billings.

KJERULFIA Kiaer, 1916. Cambrian.
Genotype *K. lata* Kiaer.

KOENIGIA=*Homalonotus*.

KOOTENIA Walcott, 1888. Cambrian.
Genotype *Bathyuriscus* (*Kootenia*) *dawsoni* Walcott.

LEHUA Barton, 1913. 3 sp. Ordovician.
Genotype *Cheirurus vinculum*.

LEIAGNOSTUS Jaekel, 1901, = *Phalacroma*.

LEIOLICHAS Schmidt, 1885. 2 sp. Ordovician.
Genotype *Platymetopus illaenoides* Nieszkowski.

LEIOSTEGIUM Raymond, 1913. 2 sp. Ordovician.
Genotype *Bathyurus quadratus* Billings.

LEJOPYGE Corda, 1847. Cambrian.
Genotype *Battus laevigatus* Dalman.

LEONASPIS Rud. & E. Richter, 1917.
Genotype *Acidaspis* (*Leonaspis*) *leonhardi* Barrande.

LEPTOPLASTUS Angelin, 1854. 10 sp. Cambrian.
Genotype *L. stenotus* Angelin.

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LEVISIA Walcott, 1911. 5 sp. Cambrian.
Genotype *Agraulos agenor* Walcott.

LICHAPYGE Callaway, 1877. 2 sp. Silurian (Middle Bala).
Genotype *L. cuspidata* Callaway.

LICHAS Dalman, 1826. 69 sp. Ordovician, Devonian.
Genotype *Entomostracites wahlenbergi.*

LIOCALYMENE Raymond, 1916, 1 sp. Silurian.
Genotype *Hemicrypturus clintoni* Vanuxem.

LIOCEPHALUS Gronwall, 1902. 6 sp. Cambrian.
Genotype *Conocoryphe impressus* Linnarsson.

LIOPARIA Lorenz, 1906, = *Anomocare.*

LIOSTRACINA Monke, 1903. 1 sp. Cambrian.
Genotype *L. krausei* Monke.

LIOSTRACUS Angelin, 1854. 22 sp., 4 var. Cambrian.
Genotype *L. aculeatus* Angelin.

LIPARGES Gürch, 1901. = *Corydocephalus.*

LISANIA Walcott, 1911. 6 sp. Cambrian.
Genotype *Anomacarella? bura* Walcott.

LLOYDIA Vogdes, 1890. 5 sp. Ordovician.
Genotype *Bathyurus bituberculatus* Billings.

LOGANELLUS Devine, 1863. 1 sp. Cambrian.
Genotype *L. quebecensis* Devine.

LONCHOCEPHALUS Owen, 1852. 15 sp. Cambrian.
Genotype *L. chippewaensis* Owen.

LONCHODOMUS Angelin, 1854, 15 sp. Cambrian.
Genotype *Ampyx rostratus* Sars.

MACROTOXUS Lorenz, 1901, = *Conaspis.*

MALLADAIA Oehlert, 1896. 1 sp. Devonian.
Genotype *Cryphaeus* (*Malladaia*) *luciae.*

MARELLA Walcott, 1912. 2 sp. Cambrian.
Genotype *M. splendens* Walcott.

MARJUMIA Walcott, 1916. 4 sp. Cambrian.
Genotype *M. typa* Walcott.

MARYVILLIA Walcott, 1916. 2 sp. Cambrian.
Genotype *M. typa* Walcott.

MARYVILLA Walcott, 1916. 2 sp. Cambrian.
Genotype *M. arion* Walcott.

MEGALASPIDES Brögger, 1896. 4 sp. Ordovician.
Genotype *M. dalecarlicus* Holm.

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MEGALASPIS Angelin, 1854. 58 sp., 17 vars. Ordovician.
Genotype *M. gigas* Angelin.

MEGALOPHTHALMUS Lorenz, 1906, = *Anomocare*.

MENEGHINELLA Bornemann, 1891. 1 sp. Cambrian.
Genotype *M. serrata* Bornemann.

MENOCEPHALUS Owen, 1852. 10 sp. Cambrian.
Genotype *M. minnesotensis* Owen.

MENOMONIA Walcott, 1916. 1 sp. Cambrian.
Genotype *Conocephalites calymenoides* Whitfield.

MESAGNOTUS Jaekel = *Agnostus* and *Peronopsis*.

MESONACIS Walcott, 1885. 3 sp. Cambrian.
Genotype *Olenus vermontanus* Hall.

MESOPHENISCUS Corda = *Agnostus*.

METACANTHUS Corda, 1847, = *Dalmanites*.

METADOXIDES Bornemann, 1891.
Genotype *Paradoxides torosus* Meneghini.
Subgenera:
CATADOXIDES. Type *C. magnificus* Matthew. 1 sp.
METADOXIDES ss. Type *M. torosus*. 1 sp.
ANADOXIDES. Type *A. armatus*. 1 sp.

METALICHAS Reed, 1902. 4 sp.
Genotype *Lichas cicatricosus* Schmidt, not Lovén.

METOPIAS Eichwald, 1842, not Gory. 1832, in Coleoptera, = *Metopolichas*.

METOPOLICHAS Gürich, 1901, for *Metopias*, preoccupied. Ordovician.
Genotype *M. hubneri* Eichwald.

MIAGNOSTUS Jaekel, 1901, = *Lejopyge*.

MICMACCA Matthew ,1895. 9 sp., 2 var. Cambrian.
Genotype *M. matthersi* Matthew.

MICRODISCUS of outhors = *Lonchodomus*, and included species of *Eodiscus* and *Goniodiscus*.

MICROPARIA *Corda*, 1847. See *Aeglina* Barrande.

MICROPYGE Corda, 1847. See *Sao*.

MILLARDIA Walcott, 1916. 3 sp. Cambrian.
Genotype *M. semele* Walcott.

MIRASPIS Rud. & E. Richter, 1917.
Genotype *Acidaspis* (*Miraspis*) *mira*.

MOHICANA Cobbold, 1910. 2 sp. Cambrian.
Genotype *M. lata* Cobbold.

MOLLISONIA Walcott, 1912. 1 sp. Cambrian.
Genotype *M. symmetrica* Walcott.

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MONADINA Corda = *Sao*.

MONORHACHIS Schmidt, 1886. 2 sp. Devonian?
Genotype *Phacops* (*Monorhachis*) *lepatini*.

NATHORSTIA Walcott, 1912. 1 sp. Cambrian.
Genotype *N. transitans* Walcott.

NATTAINIA Eaton, 1832. See *Cryptolithus*.
Portlock, 1843, used this name for *Lichas hibernicus*.

NEOLENUS Matthew, 1890. 6 sp. Cambrian.
Genotype *Ogygia serrata* Rominger.

NESEURETUS Hicks, 1872. Cambrian, Tremadoc.
Genotype *N. ramseyensis* Hicks.

NEVADIA Walcott, 1910. 1 sp. Cambrian.
Genotype *N. weeksi* Walcott.

NIESZKOWSKIA Schmidt, 1881. 9 sp. Ordovician, Silurian.
Genotype *Sphaeroxochus cephaloceras* Nieszkowski.

NILEOIDES Raymond, 1920. 1 sp. Ordovician.
Genotype *N. perkinsi*.

NILEUS Dalman, 1826. 12 sp., 2 var. Ordovician.
Genotype *Aspahus* (*Nileus*) *armadillo* Dalman.

NIOBE Angelin, 1852. 16 sp. Ordovician, Tremadoc.
Genotype *N. lata* Angelin.

NORWOODIA Walcott, 1916. 5 sp. Cambrian.
Genotype *N. gracilis* Walcott.

NOTASAPHUS Gregory, 1903. Cambrian.
Genotpye *N. fergusoni* Gregory.

OCTILLAENUS Salter, 1867. 1 sp. Ordovician.
Genotype *Illaenus hisingeri* Barrande.

ODONTOCEPHALUS Conrad, 1840. 4 sp. Devonian.
Genotype *Dalmanites* (*Odontocephalus*) *selenurus*.

ODONTOCHILE Corda, 1847. Preoccupied, 1834, in Coleoptera.
Genotype *O. applanata* Corda.

ODONTOPLEURA Emmrich, 1839. 57 sp. Ordovician, Silurian.
Genotype *O. ovata* Emmrich.

ODONTOPYGE Corda, 1847. Cambrian.
Genotype *Olenus gibbosus* Dalman, part.

OGYGIA Brongniart, 1822. 24 sp. Cambrian, Silurian. Preoccupied in *Lepidoptera* in 1822. Replaced by *Ogygiocaris* Angelin, 1854.

OGYGINUS Raymond, 1912. Ordovician.
Genotype *Asaphus corudensis* Murchison.

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OGYGIOCARIS Angelin, 1854. 3 sp., 5 var. Ordovician, Cambrian.
Genotype *Trilobus dilatatus* Brunnich.

OGYGITES Tomelin & Lebesconte, 1876. 29 sp.
Genotype *Ogygia guettardi* Brongniart.

OGYGOPSIS Walcott, 1888. 1 sp. Cambrian.
Genotype *Ogygia klotzi* Rominger.

OLENELLOIDES Peach, 1894. 1 sp.
Genotype *O. armatus* Peach.

OLENELLUS Hall, 1860. 17 sp. Cambrian.
Genotype *Barrandia thompsoni* Hall.

OLENOIDES Meek, 1877. 5 sp. Cambrian.
Genotype *Paradoxides? nevadensis* Meek.

OLENOPSIS Bornemann, 1891. 11 sp. Cambrian.
Genotype *Olenus zoppii* Meneghini.

OLENUS Dalman, 1827. 20 sp., 1 var. Cambrian or later.
Genotype *Entomostracites gibbosus.*

ONCHOLICHAS Schmidt, 1885. 4 sp. Silurian.
Genotype *Lichas ornatus.*

ONCHOMETOPUS Schmidt, 1898. 5 sp. Ordovician.
Genotype *O. volborthi.* Nine species have been referred to this genus, four of which Raymond referred to *Homotelus* gen. nov.

ONYCOPYGE Woodward, 1880. 1 sp. Cambrian.
Genotype *O. liversidgei* Woodward.

ORINOPS Rafinesque, 1832, = *Calymene.*

OROMETOPUS Brögger, 1896. 2 sp. Ordovician.
Genotype *Holometopus? elatifrons* Angelin.

ORRIA Walcott, 1916. 1 sp. Ordovician.
Genotype *O. elegans* Walcott.

ORYCTOCARE Walcott, 1908. 1 sp. Cambrian.
Genotype *O. geikiei* Walcott.

ORYCTOCEPHALUS Walcott, 1886. 4 sp. Cambrian.
Genotype *O. primus* Walcott.

OSCEOLIA Walcott, 1914. 1 sp. Upper Cambrian.
Genotype *Dikelocephalus osccola* Hall.

OTARION Zenker, 1833.
A heterogeneous assembly of species belonging in part to the genera *Ceraurus, Conocoryphe,* and *Synhomalonotus.*

OWENELLA Walcott = *Marjumia.*

PAEDUMIAS Walcott, 1910. 1 sp. Cambrian.
Genotype *P. transitans* Walcott.

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PAGETIA Walcott, 1916. 2 sp. Fam. Eodiscidae. Cambrian.
Genotype *P. bootes* Walcott.

PAGODIA Walcott, 1905. 4 sp. Upper Cambrian.
Genotype *P. lotus.*

PAGURA Emmons = *Bathynotus.*

PALAEOLENUS Mansuy, 1912. 3 sp.
Genotype *P. douvillei* Mansuy.

PALAEOPYGE Salter, 1856. 1 sp. Cambrian.
Genotype *P. ramsayi* Salter. A very doubtful genus.

PANDERIA Volborth, 1863. 13 sp. Ordovician.
Genotype *P. triquetra* Volborth.

PARABOLINA Salter, 1849. 17 sp., 2 var. Cambrian.
Genotype *Entomostracites spinulosus* Wahlenberg.

PARABOLINELLA Brögger, 1882. 13 sp... Cambrian.
Genotype *P. limitis* Brögger.

PARABOLINOPSIS Boeck, 1912.
Genotype *P. mariana* Hoek.

PARADECHENELLA Richter, 1912. Devonian.
Genotype *Dechenella* (*Paradechenella*) *tschernyschewi.*

PARADOXIDES Brongniart, 1822. 46 sp., 10 var. Cambrian.
Genotype *P. tessini* Brongniart.

PARAGNOSTUS Jaekel, 1909. See *Condylopyge.*

PARAHOMALONOTUS Reed, 1918. 8 sp. Devonian.
Genotype *Homalonotus* (*Parahomalonotus*) *gervillei.*

PARALEJURUS Corda, 1847. See *Bronteus.*

PARALICHAS Reed, 1902. 5 sp. See *Amphilichas.*

PEACHELLA Walcott, 1910. 1 sp. Cambrian.
Genotype *Olenellus iddingsi* Walcott.

PECTUNCULITES Hermann, 1711.
The earliest description of a Trilobite of the genus *Encrinurus.*

PELTURA Milne-Edwards, 1840. 10 sp., 3 var. Cambrian.
Genotype *Entomstracites scarabaeoides* Wahlenberg.

PEMPHIGASPIS Hall, 1863. 15 sp. Cambrian.
Genotype *P. bullata* Hall.

PENNAIA Clarke, 1913. Devonian.
Genotype *P. pulliana* Clarke.
A very distinct variation of the Mesembria type of *Dalmanites.*

PERONOPSIS Corda, 1947. Cambrian.
Genotype *Battus integer* Beyrich.

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PETIGURUS Raymond, 1913. 2 sp. Ordovician.
Genotype *Bathyurus nero* Billings.

PHACOPIDELLA Reed, 1903. 12 sp. Devonian.
Genotype *Phacops glockeri* Barrande.

PHACOPINA Clarke, 1913. 4 sp. Devonian.
Genotype *Phacops brasiliensis* Clarke.

PHACOPS Emmrich, 1839. About 133 sp. Ordovician, Silurian, Devonian.
Genotype *Phacops latifrons* Bronn.

PHAETHONIDES Angelin, 1854, 13 sp. (8 sp. to *Cordania*) Devonian.
Genotype *P. archiaci* Angelin.

PHAETON Barrande, 1846, not of Brisson, 1770. Changed to *Prionopeltis*.

PHAETONELLUS Novàk, 1890. 4 sp. Devonian, (f/2).
Genotype *Proetus* (*Phaetonellus*) *planicauda rhenanus*.

PHALACROMA Corda, 1847. Cambrian.
Genotype *Calymene pulchra* Barrande.

PHANOPTES Corda, 1847. See *Paradoxides*.

PHAROSTOMA Corda, 1847. 6 sp. Ordovician.
Genotype *Calymene pulchra* Barrande.
Synonym of *Prionocheilus* Rouault.

PHILLIPISA Portlock, 1843. About 90 sp., 3 var. Carboniferous.
Genotype *Asaphus gemmuliferus* Phillips.

PHILLIPSINELLA Novàk, 1885. 1 sp. Ordovician.
Genotype *Phillipsia parabola* Barrande.

PHLYSACEUM Corda, 1847, = *Paradoxides*.

PHYLLASPIS Richter, 1863. 1 sp. Devonian.
Genotype *P. raniceps*.

PILEKIA Barton, 1915. 4 sp. Ordovician.
Genotype *Ch. apollo* Billings.

PILIOLITES Cozzens, 1846, = *Proetus*.

PLACOPARIA Corda, 1847. 4 sp. Ordovician.
Genotype *P. zippei* Boeck.

PLAESIACOMIA Corda, 1947. Referred to *Homalonotus*.

PLATOPOLICHAS Gürich, 1901. 9 sp., 1 var. Ordovician.
Genotype *P. margaritifera* Nieszkowski.

PLATYCOLPUS Raymond, 1913. 7 sp. Ordovician.
Genotype *Bathyurus capax* Billings.

PLATYMETOPUS Angelin, 1854. 12 sp. Preoccupied, see *Amphilichas*.

PLATYNOTUS Conrad, 1839, not Fabricius 1801, in Coleoptera = *Arctinurus*.
Genotype *Paradoxides boltoni*.

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PLATYPELTIS Callaway, 1874. 3 sp.
Genotype *Asaphus* (*Platypeltis*) *crofftii* Callaway.

PLETHOPELTIS Raymond, 1913. 2 sp. Cambrian.
Genotype *Agraulos saratogensis* Walcott.

PLEURACANTHUS Milne-Edwards, 1840, = *Dalmanites*.

PLEUROCTENIUM Corda, 1847. Cambrian.
Genotype *Battus granulatus* Barrande.

PLIOMERA Angelin, 1852. 11 sp.
Genotype *Amphion fischeri* Eichwald.
Subgenus:
ENCRINURELLA Reed, 1915.
Genotype *Pliomera* (*Encrinurella*) *insangensis* Reed.

PLIOMEROPS Raymond, 1918. Ordovician.
Genotype *Amphion canadensis* Billings.

PLUSIARGES Gürich, 1901, preoccupied. See *Corydocephalus*.

PLUTONIA Hicks, 1871, = *Paradoxides*.

POLIELLA Walcott. 9 sp. Cambrian.
Genotype *Bathyuriscus* (*Poliella*) *anteros*.

POLYERIS Rouault, 1846. = *Odontopleura*.

POLYTOMURUS Corda, 1847, = *Dionide*.

PORCELLIANA Isberg, 1917. 1 sp. Ordovician.
Genotype *P. longicornis*.

PORTLOCKIA McCoy, 1843. 3 sp. = *Acaste*.

PRIMASPIS Rud. & E. Richter, 1917. Ordovician.
Genotype *Acidaspis* (*Primaspis*) *primordialis* Barrande.

PRINOPELTIS Corda, 1847. 5 sp. Devonian.
Genotype *P. archaica* Barrande.

PRIONOCHEILUS Rouault, 1846, = *Calymene*.

PROAMPYX Frech, 1902. 3 sp. Cambrian.
Genotype *Anomocare acuminatum* Angelin.

PROBOLIUM Oehlert, 1889. 7 sp. Devonian.
Genotype *Dalmanites* (*Probolium*) *galloisi*.

PROBOLOIDES Clarke, 2 sp. Devonian.
Genotype *P. cuspidatus Clarke*.

PROCERATOPYGE Wallerius, 1895. Cambrian.
Genotype *P. conifrons* Wallerius.

PROETUS Steininger, 1831. Over 200 sp. (226?). Ordovician, Silurian, Devonian, Carboniferus.
Genotype *P. cuvieri* Steininger.
Richter divides the Devonian representatives into 9 subgenera, *Drevermannia, Cyrtosymbole, Typhroproetus, Pteroparia, Euproetus, Proetus* s. s., *Astycoryphe, Eremiproetus, Cornuproetus*.

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PROSOPISCUS Salter. Fam. Cheiruridae Barton. Middle Ordovician.
Genotype *P. minus* Salter.

PROTAGRAULOS Matthew, 1895. 1 sp. Cambrian.
Genotype *P. priscus* Matthew.

PROTOLENUS Matthew, 1892. 9 sp. Cambrian.
Genotype *P. paradoxides* Matthew.

PROTOLICHAS Reed, 1902. Reed used this name for his first group of the Lichadidae.

PROTOPELTURA Brögger. 1882. 5 sp., 2 var. Cambrian.
Genotype *P. acuthura* Brögger.

PROTYPUS Walcott, 1886. 3 sp. Cambrian, Ordovician.
Genotype *Angelina hitchcocki* Whitfield.

PSEUDAGNOSTUS Jaekel, 1909. Cambrian.
Genotype *Agnostus cyclopyge* Tullberg.

PSEUDOPHILLIPSIA Gemmellaro, 1890. 2 sp. Carboniferous.
Genotype *P. elegans*.

PSEUDOSPHAEREXOCHUS Schmidt, 1881. 11 sp. Ordovician, (C 1/b).
Genotype *Sphaerexochus hemicranium* Kutorga.

PSILOCEPHALUS Salter, 1866. 2 sp. Lower Tremadoc.
Genotype *P. innotatus* Salter.

PTEROCEPHALIA Roemer, 1849. 6 sp. Cambrian.
Genotype *P. sancti-sabae* Roemer.

PTEROLICHAS Gürich, 1901, = *Arctinurus* Castelnau.

PTEROPARIA Richter, 1913. 1 sp. Devonian.
Genotype *P. columbella* Richter.

PTERYGOMETOPUS Schmidt, 1881.
Genotype *Calymene sclerops* Dalman.

PTYCHAGNOSTUS Jaekel, 1909. Cambrian.
Genotype *Agnostus punctulosus* Angelin.

PTYCHASPIS Hall, 1863. 22 sp. Cambrian.
Genotype *Dikelocephalus miniscaensis* Owen.

PTYCHOCHEILUS Novak, 1883. 2 sp. Ordovician.
Genotype *Ogygia discreta* Barrande.

PTYCHOPARIA Corda, 1847. Cambrian.
Genotype *Conocephalus striatus* Emmrich.

PTYCHOPYGE Angelin, 1854. 28 sp., 5 var. Ordovician.
Genotype *P. glabrata* Angelin.

RADIASPIS Richter. Devonian.
Genotype *Acidaspis* (*Radiaspis*) *radiata* Goldfuss.

RAPHIOPHORUS Angelin, 1854, = *Ampyx*.

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REDLICHIA Crossman, 1902. 7 sp. Cambrian.
Genotype *Hoeferia noetlingi* Redlich.

REEDIA Wedekind, 1911, 11 sp. Silurian.
Genotype *Phacops* (*Reedia*) *bronni*.

REMOPLEURIDES Portlock, 1843. 19 sp., 1 var. Cambrian, Ordovician.
Genotype *R. colbyi*.

RHINASPIS Remelé, 1885.
Genotype *R. erratica* Remelé.

RHODOPE Angelin, 1854, not of Koll, 1847, = *Illaenus*.

ROBERGIA Wiman, 1902. 1 sp., 1 var. Cambrian.
Genotype *Remopleurides microphthalmus* Linnarsson.

SALTERIA Thompson, 1864. 2 sp. Cambrian.
Genotype *S. primaeva* Thompson. Genus closely related to *Dionide*.

SALTERIA Walcott, 1884, = *Bailiella*.

SAO Barrande, 1846. 2 sp. Cambrian.
Genotype *Sao hirsuta* Barrande.

SARATOGIA Walcott, 1916. 10 sp. Cambrian.
Genotype *S. calcifera* Walcott.

SARKIA Kloucek, 1920. Ordovician.
Genotype *S. bohemica*.

SAUKIA Walcott, 1914. 13 sp. Cambrian.
Genotype *Dikelocephalus lodensis* Whitfield.

SCHANTUNGIA Lorenz, 1906. 4 sp. not of Walcott, 1905.

SCHIZOPROETUS Richter, 1913. Fam. Aeonidae. Devonian.
Genotype *S. celechovensis*.

SCHIZOPYGE Clarke, 1890. 3 sp. Devonian.
Genotype *Homalonotus* (*Schizopyge*) *paraná* Clarke.

SCHMALENSEEIA Moberg, 1903. 1 sp. Cambrian.
Genotype *S. amphionura* Moberg.

SCHMIDTELLA Tschernyschew, 1893. 2 sp. Devonian.
Genotype *S. uralica*.

SCHMIDTELLA Matthew, 1895. For a genus of Ostracoda.

SCHMIDTIA Moberg, 1890, = *Mesonacis*.

SCHMIDTIELLUS Moberg & Segerberg, 1906, = *Mesonacis*.

SELENOPELTIS Corda, 1847, 1 sp. = *Acidaspis*.

SELENOPYCHUS Corda, 1847, = *Aeglina*.

SHANTUNGIA Walcott, 1905. 2 sp. Cambrian.
Genotype *S. spinifer* Walcott.

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SHUMARDIA Billings, 1865. 10 sp., 1 var. Cambrian.
Genotype *S. granulosa* Billings.

SKEMMATOPYGE Rud. & E. Richter, 1 sp. Devonian.
Genotype *S. tietzeri* Richter.

SOLENOPLEURA Angelin, 1854. 34 sp., 4 var. Cambrian.
Genotype *S. holometopa* Angelin.

SOMATRIKOPON M. Murtrie, 1819. Devonian.
Genotype *S. megalomaton* (Phacops rana).
The author's description, although suggesting a *Phacops*, is very obscure, and without illustration of the genus. This early description of a *Phacops* can be adopted only by the same courtesy which was given by many authors to Murchison's *Trinucleus*.

SPHAEREXOCHUS Beyrich, 1845. 23 sp. Ordovician, Silurian.
Genotype *S. mirus* Beyrich.

SPHAEROCORYPHE Angelin, 1854. 12 sp. Ordovician.
Genotype *S. dentata* Angelin.

SPHAEROPHALMUS Angelin, 1854. 8 sp. 1 var. Cambrian, Ordovician, Silurian.
Genotype *S. flagellifer* Angelin.

STAUROCEPHALUS Barrande, 1846. 6 sp. Silurian.
Genotype *Trochurus speciosus* Beyrich.

STAUROGMUS Corda, 1847. See *Sao*.

STEPHANOCARE Monke, 1903. 4 sp. Camrbian.
Genotype *S. richthofeni*. Monke.

STRENUELLA Matthew, 1887. 5 sp., 2 var. Fam. Conocoryphidae, Cambrian.
Genotype *Agraulos strenuus* Billings.

STYGINA Salter, 1853. 2 sp., Fam. Styniginidae Raymond. 1920. Ordovician.
Genotype *Asaphus latifrons* Portlock.

SYMPHYSURUS Goldfuss, 1843. 16 sp. Ordovician.
Genotype *Asaphus palpebrosus* Dalman.

SYNHOMALONOTUS Pompeckj, 1898. 7 sp., 1 var. Cambrian.
Genotype *Calymene tristani* Brongniart.

SYNPHORIA Clarke, 1890. 3 sp., 1 var. Devonian.
Genotype *Dalmanites* (*Synphoria*) *stemmatus*.

TEINISTION Monke, 1903, 4 sp. Cambrian.
Genotype *T. lansi* Monke.

TELEPHUS Barrande, 1852, 9 sp. Ordovician.
Genotype *T. fractus* Barrnade.

TERATASPIS Hall, 1863. 2 sp. Fam. Lichadidae. Devonian.
Genotype *T. grandis*.

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TERATORHYNCHUS Reed, 1904. Ordovician.
Genotype *Remopleurides* (*Teratorhynchus*) *bicornis* Reed.

TETRACNEMIS Corda, 1847, = *Sao*.

THALEOPS Conrad, 1843. 4 sp. Ordovician.
Genotype *T. ovatus* Conrad.

THYPHOPROETUS Frech, 1913. 2 sp. Devonian.
Genotype *T. microdiscus*.

THYSANOPELTIS Corda, 1847. 13 sp.
Genotype *Bronteus thysanopsis*.

THYSANOPYGE Kayser, 1898. Ordovician.
Genotype *T. argentina*.

TIRESIAS McCoy, 1846. Cranidium only known. Reed, 1898, says it seems to be allied to *Ampyx*.

TOERNQUISTIA Reed, 1904. Ordovician, Llandeilo.
Genotype *Cyphaspis* (*Törnquistia*) *nicholsoni* Reed.

TOXOTIS Wallerius, 1895. Cambrian.
Genotype *T. pusilla* Wallerius.

TRACHYLICHAS Gürich, 1901, = *Dicranopeltis*.

TRACHYOSTRACUS Lorenz, 1906. Contains a mixture of generic forms.

TRAMORIA Reed, 1899. Ordovician.
Genotype *T. punctata*. The author abandoned the genus and referred the species to *Apatokephalus*.

TRAPELOCERA Corda, 1847. 3 sp. Silurian.
Genotype *Acidaspis vesiculosa* Beyrich.

TRETASPIS McCoy, 1849. 3 sp. Ordovician.
Genotype *Asaphus seticornis* Hisinger.

TRIARTHRELLA Hall, 1863. Cambrian.
Genotype *T. auroralis* Hall.

TRIARTHRUS Green, 1832. 10 sp., 2 var. Ordovician.
Genotype *T. beckii* Green.

TRIGONASPIS Sanderberg, 1850, = *Proetus*.

TRIGONOCEPHALUS Zenker, 1833. = *Conocephalites*, now also abandoned.

TRIMEROCEPHALUS McCoy, 1849. Devonian.
Genotype *Trinucleus laevis* Münster.
Gortani, 1907, divides the genus into two subgenera:
1. *Trimerocephalus* (*Microphthalmus*) Type *T. cryptophthalmus*, 7 sp.
2. *Trimerocephalus* (*Eutrimerocephalus*) Type *T. laevis*, 4 sp.

TRIMERUS Green, 1832. 4 sp. = *Homalonotus*.

TRINUCLEUS Llwyd, Murchison, 1839. See *Cryptolithus* Green, 1832

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TROCHURUS Beyrich, 1845, = *Staurocephalus*.

TROCHURUS Lindström, 1885, (3 sp. Silurian) and *Corydocephalus* are confused.
Genotype *T. pusillus* Angelin.

TROPIDOCORYPHE Novàk, 1890. 7 sp. Devonian.
Genotype *T. filicostata*.

TSINANIA Walcott, 1914. 3 sp. Cambrian.
Genotype *Illaenurus canens* Walcott.

TYLOPROETUS Rud. & E. Richter, 1913. 2 sp. Devonian.
Genotype *T. schindewolfi*.

TYPHLONISCUS Salter, 1852. Devonian.
Genotype *T. bainii*.

URALICHAS Delgado, 1892. Silurian.
Genotype *Lichas* (*Uralichas*) *ribeiroi* Delgado.

VANUXEMELLA Walcott, 1908. 2 sp. Cambrian.
Genotype *V. contracta Walcott*.

VOGDESIA Raymond, 1910. 2 sp. Ordovician.
Genotype *Isotelus bearsi*. The genus is closely related to *Homotelus* and *Brachyaspis*.

WANNERIA Walcott, 1910. 3 sp. Cambrian.
Genotype *Olenellus* (*Holmia*) *walcottanus* Wanner.

WESSEKIA Raymond, 1916.
Genotype *Illaenus katzeri* Barrande.

WEYMOUTHIA Raymond, 1913. Cambrian
Genotype *Agnostus? nobilis* Ford.

XIPHOGONIUM Corda, 1847. 5 sp. Devonian.
Genotype *X. lovéni* Barrande.

YOUNGIA Lindström, 1885. 4 sp. Silurian, Devonian.
Genotype *Cheirurus trispinosus* Young.

ZACANTHOIDES Walcott, 1888. 11 sp. Cambrian.
Genotype *Olenoides speciosus* Walcott.

ZETHUS Pander, 1830.
Genotyve *Zethus verrucosus*.

Pander had a mere fragment and evidently intended to describe a species of *Cheirurus* (*Pseudosphaerexochus*) as the type of his genus. The name cannot be accepted for *Cybele* or *Cheirurus* without creating confusion, as Salter remarked in 1855.

Pander's collection, Academy of Science, St. Petersburg, was destroyed by fire. Dr. Schmidt referred Pander's species to *Cybele bellatula*, Rev. 1, p. 203. In Rev. 6, 1907, he renamed it *Cybele panderi* and described it as a new species.

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PART III.

A SUMMARY OF THE ORDOVICIAN GENUS CYBELE LOVEN

CHRONOLOGICAL BIBLIOGRAPHY

BRONGNIART, ALEXANDRE. Histoire Naturelle des Crustacés Fossiles, 1822, p. 145, pl. IV, fig. 11.

The author does not name the cephalon figured, but remarks that it differs from all the other described species. The figure was from a drawing by Mr. Stokes of a specimen found in the Llandeilo group in England (*Cybele verrucosa*).

DALMAN, J. W. K. Svensk. Vet.-Akad. Handl., No. 4, 1826, p. 285.

The author uses the name *Calymene verrucosa* for a species of *Cybele*.

This work was also published as Om Palaederna eller de sa kall de Trilobiterna, Stockholm, 1826, with 6 plates; also a German translation by Fried. Engelhart, Nürnberg, 1828.

Dalman describes *Calymene bellatula*, Palaeaderna, p. 43, pl. 1, fig. 4 a-d, from Husbyfjol, Ostergotland.

————Arsberatt Zool. Arbet., 1828, p. 134, foot-note.

The author describes *Calymene verrucosa* from a pygidium. Férussac, Bull. Sci. Geol., Vol. 19, 1829, gives a note of this paper.

VON SCHLOTHEIM, BARON E. F. Nachträge zur Petrefactenkunde, 1832, Petrik. III, pp. 40 & 86, pl. 22, fig. 5.

Trilobites velatus (referred to *Cybele verrucosa*).

ESMARCK, M. T. Om nogle nveArter af Trilobiter.—Mag. fur Naturvidensk, Ander Rakkes, Christiania, Vol. 1, 1833, p. 269, pl. 7, fig. 10.

Describes and figures a new species of *Cybele* as *Trilobites dentatus* from a pygidum which has four pairs of spined pleurae on the lateral lobes, and an axis with fifteen rings, excluding the tip.

BOECK, C. Uebersicht der bisher in Norwegen gefundenen formen der Trilobiten Familie, 1838.

The author gives (p. 139, No. 7), the following description of *Trilobites dentatus* Esmarck: The semicylindrical glabella, which is rounded at the anterior part, has three lateral furrows, and the genal angles terminate in spines like the pleurae of the thorax. Brögger referred this to *Cybele bellatula*.

EICHWALD, EDOUARD VON. Schichtensystem von Estland, 1840.

The author reviews the generic name *Cryptonymus*, 1825, genotype *Calymene punctatus*, and places certain species described under *Encrinurus* and *Cybele* under *Cryptonymus*. He named two new spcies, *Cryptonymus parallelus*, p. 73, (referred by Schmidt to *Panderia*) and *C. wörthi*.

PORTLOCK, J. E. Geological Report on Londonderry, &c., 1843, p. 302.

Describes under the genus *Ogygia* a new species of *Cybele* from the Irish Ordovician Schist of Tyrone at Desertcrest, *Ogygia rugosa* sp. nov.; description drawn from the pygidium.

LOVEN, S. Evensk Trilobiter.—K. Svensk Vet.—Akad., 1845, p. 110, pl. 1, 2.

Describes his new genus *Cybele* and cites three species, *Cybele bellatula* Dalman; *C. verrucosa* Dalman; *C. velata* Schlotheim.

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McCOY, FREDERICK. Synopsis of the Silurian Fossils of Ireland, 1846, p. 47, pl. 4, fig. 12.

Calymene arenosa, referred to *Cybele* by Bigsby.

BURMEISTER, H. Organization of Trilobites, English Edition, 1846, p. 119, No. 5.

The author referred to Esmarck's paper Om nogle nye Arter af Trilobiter, 1833, pl. fig. 10. *Tr. dentatus,* a species with a large pygdium with a many jointed axis and three pairs of pleurae on the lateral lobes.

CORDA, A. J. C. Prodrom einer Monographie der bömischen Trilobiten, 1847.

Describes and illustrates *Cybele bellatula* Dalm., and *Calymene verrucosa* Dalm., which he refers to his genus *Atractopyge.*

VOLBORTH, A. VON. Ueber einige Russischen Trilobiten.—Verhandl. Russ. Min. Ges., 1847, p. 1.

The author revives Pander's old generic name *Zethus* and describes and illustrates *Zethus verrucosus* Pander, referring to this species *Cryptoymus parallelus* and *Cybele bellatula* Lovén, with *Tril. velatus* Schloth. (Schmidt, Rev. 6, referred it to *Cybele panderi*). He also described and figured *Zethus bellatulus* Dalm., which is now referred to *Cybele wörthi* by Schmidt.

ANGELIN, N. P. Palaeontologia Scandinavica.—Part 1. Iconographia Crustaceorum Formationis Transitionis. Fasc. 1, 1851, pp. 24, plates 21. Part 2. Palaeontologia Schandinavica, 1854, pp. 92, plates 42.

Revised edition by Lindström, 1878, pp. 96, plates 42, with additional plates to replace Angelin's rejected ones.

The author revives Eichwald's older genus *Cryptonymus,* placing under it species now classed under *Encrinurus, Zethus* and *Cybele;* of the genus *Cybele,* such species as *Cryptonymus bellatulus* Dalm., *C. verrucosus* Dalm., *Cybele dentata* Esm. & *C. brevicauda* Ang.

BRONN, H. G. & ROEMER, F. Lethaea Geognostica oder Abbildung und Beschreibung der für die Gebirge Formationen Bezeichnendsten Versteinerungen, Erster Band, 1851-1856, p. 654.

Zethus Pander, 1830; *Cybele* Lovén, 1845.

Zethus verrucosus Pander; *Cybele bellatula* Lovén.

EICHWALD, EDOUARD VON. Uber die Gattungen *Cryptonymus* und *Zethus* 1855.

The author remarks, p. 7, on changing the limits of *Cryptonymas,* 1825:

"Soon after my journey from Willna to St. Petersburg, I had the opportunity to renew my observations in the neighborhood of Zarskoje-Selo and Pawlowsk, and shortly afterwards on several occasions in Estland.

"My collection of trilobites consisted not only of the species which I had described, but also of many new forms. I referred the species, which had hitherto been classed under *Cryptonymus,* 1825, to *Illaenus,* for this genus had met universal acceptance, to the detriment of my *Cryptonymus.* In the year 1840 I gave to *Cryptonymus* a new signification and referred to it *Calymene punctatus* Dalm. and *C. variolaris* Brongniart in part, and added two new species, *Cryptonymus wörthi* and *C. parallelus.*

"In taking the well known *Calymene punctatus* Dalm. as the typical form for the genus, we gave a short description, reserving the exact diagnosis for the Palaeontology of Russia.

"It is possible for any person, who will decide impartially and generously with regard to the new limitation of the genus *Cryptonymus,* to readily perceive its characters from the type. Angelin, in his Monograph on the Swedish Trilobites, not only recognized my genus, but gave the generic formula."

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On page 22 Eichwald remarks:

"The following is the position which I previously held and still advocate:

"First:—To maintain *Cryptonymus* as a genus for several Russian and Swedish trilobites, according to Angelin's diagnosis, which was derived from my short, but distinct description, given in my work on the Silurian System of Estland.

"Second:—To acknowledge *Zethus* Pander only as a genus for *Zethus uniplicatus*. This is the typical species given by the author, so we have no authority to take this species, which differs from all other trilobites, and class it under *Zethus verrucosus* which was doubtfully referred to this genus by Pander, and, by this combination, establish an independent genus.

"Third:—*Zethus verrucosus* Pander is probably *Cryptonymus verrucosus* Angelin, not *Crypt. parallelus* Eichw. or *Cybele bellatula* Lovén. *Z. bellatula* Volborth is a synonym of *Crypt. wörthi* and not of *Calymene punctata* Dalman, or of *variolaris* Brongniart."

VOLBORTH, A. VON Uber die prioritätsrechte der Trilobiten-Gattung *Zethus* Pander, gegen die *Cryptonymus* Eichwald.—Bull. Acad. Sci. de St. Petersb., Tom. 12, No. 19, 1855, pp. 251-262.

Referred Eichwald's genus *Cryptonymus* to *Zethus*.

HOFFMANN, E. Sämmtliche bis jetzt bekannte Trilobite Russlands.—Verhandl. Russ. K. Min. Ges. Jahrgang, 1857-8, p. 31.

Under the genus *Zethus* the author describes *Cybele bellatula* Dalman, *C. verrucosa* Pander (referred by Schmidt to *C. bellatula*) and *Z. uniplicatus* Pander (referred to another genus).

NIESZKOWSKI, J. Monograph of Baltic Trilbolites.—Archiv. für die Naturkunde Liv-Est.—und Kerlands, Bd. 1, 1857-59.

Gives a description of the genus *Encrinurus*, including *E. sexcostatus* Salter (referred doubtfully by Schmidt to *Cybele brevicauda*); also a description of the genus *Zthus* Pander, to which he referred *Zethus bellantula* Dalman (*Cybele bellautula*); *Z. res* sp. nov., 400 pl. fig. 3; *Z. atractopyge* McCoy (referred by Schmidt to *Cybele brevicauda* Angelin?); *Z. brevicauda* Ang.

EICHWALD, EDOUARD VON. Lethaea Rossica, ou Paléontologie de la Russie, Vol. 1, 1860, p. 1414.

Cryptonymus bellatula Dalman, p. 1414; *C. wörthi Eichw.*, p. 1416, pl. 54, fig. 17; *C. parallelus* Eichw., p. 1417, (referred by Schmidt to *Cybele panderi*).

SALTER, J. W. &. WOODWARD, HENRY. A Catalogue of the Cambrian and Silurian Fossils Contained in the Geol. Mus. Univ. Cambridge, 1863, p. 51.

Cybele verrucosa Dalm. (figured); *C. rugosa* Portl.

SALTER, J. W. & WOODWARD, HENRY. Chart of Fossil Crustacea with Descriptive Catalogue, 1865.

An entire figure of *Cybele verrucosa* Dalm., p. 12, No. 48.

KJERULF, THEODOR. Veiviser, 1865.

Gives in his list of fossils, p. 6, *Cybele dentata* Esm., which has been referred to *Cybele bellatula*.

BILLINGS, E. Palaeozoic Fossils of Canada. Vol. 1, 1865.

On p. 292 the author describes, under *Cybele mirus*, the cephalon of an *Amphion* (*Pliomera*), and the pygidium of a *Cybele*.

SALTER, J. W. & WOODWARD, HENRY. The Geology of North Wales. Crustacea.—Mem. Geol. Sur., Vol. 3, 1866, p. 324, pl. 19, fig. 7, (head).

Cybele verrucosa.

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BIGSBY, JOHN J. Thesaurus Siluricus, 1868, p. 45.

Refers *Calymene arenosa* McCoy to the genue *Cybele.*

LINNARSSON, J. G. O. Vestergöthlands Cambiska & Siluriska Aflagringar, 1869, p. 62.

Describes and illustrates two new species, *Cybele aspera* and *C. lovéni,* with notes on *C. verrucosa.*

ETHERIDGE, E. Geology of the Northern Lakes.—Mem. Geol. Sur. England & Wales, 1876, p. 112.

Describes *Cybele ovata* sp. nov. from the Skiddaw Slates.

The author gives no figure of this imperfect specimen, but remarks that it differs essentially from *Cybele rugosa* and *C. verrucosa,* which species are not known at present below the Caradoc rocks.

Postlethwaite in his paper on the Trilobites of the Skiddaw Slates, p. 465, figures it for the first time, pl. 8, fig. 17, 19.

VOGDES, A. W. Monograph of the Genera Zethus, Cybele, &c., 1878.

Under *Cryptonymus* the author describes and figures *C.* (*Cybele*) *rex* Nieszk; *C.* (*Cybele*) *bellatulus* Dalman; *C.* (*Cybele*) *atractopyge* McCoy (*Cybele verrucosa*), with figure; *C.* (*Cybele*) *brevicauda* Angelin; *C.* (*Cybele*) *dentatus* Esmarck; *C.* (Cybele) *wörthi* Eichwald; *C.* (*Atractopyge*) *mirus* Billings.

NICHOLSON, H. A. & ETHERIDGE, R. A Monograph of the Silurian Fossils of the Girvan District in Ayrshire, Fasciculus 1, 1878, pp. 110-112.

Describes and figures *Cybele verrucosa* Dalman and *C. rugosa* Portlock (referred to *Cybele lovéni* by Reed).

SCHMIDT, F. Rev. 1, Ostbaltischen Silurischen Trilobiten, 1881, p. 197.

Describes and illustrates nine species of *Cybele,* including five new species, viz.:

Cybele bellatula Dalm., (afterwards, Rev. 6, referred in part to a new species, *Cybele panderi,* to which he refers *Zethus* Pander), p. 140, pl. 4, fig. 4; pl. 5, fig. 5; *Zethus verrucosa* Volborth, 1847, p. 8, pl. 1, fig. 5-7; *Cryptonymus parallelus* Eichwald, Leth. Ross, p. 1417, and *Cybele bellatula* Schmidt, Rev. 1, p. 2-3, pl. 13, fig. 9-13, pl. 15, fig. 1, 3-5.

Cybele revaliensis sp. nov.; *C. rex* Nieszk; *C. grewingki* sp. nov.; *C. coronata* sp. nov.; *C. wörthi* Eichwald; *C. affinis* sp. nov.; *C. kutorgae* sp. nov.; *C. brevicauda* Angelin.

CLARKE, J. M. Geology of Minnesota, Final Report, Vol. 3, 1884.

Description and text figures of the new species *Cybele winchelli* from the Galena limestone. Slocum refers this to his genus *Cybeloides.*

LA TOUCHE, J. D. Handbook of the Geology of Shropshire, 1884, p. 40, p.l 3, fig. 60.

Cybele verrucosa figured entire. Llandeilo to Caradoc.

WIGAN, GEORG. Ueber die Trilobiten der Silurischen Geschiebe in Mecklenberg, 1888, p. 28.

Cybele bellatula Dalman; *C.* cf. *coronata* Schmidt; *C. grewingki* Schmidt; *C. wörthi* Eichwald.

REED, F. R. COWPER. Geol. Mag., Decade IV, Vol. 2, 1895, p. 49, pl. 7, fig. 11.

Cybele tramorensis sp. nov., from a spatulate-fronted head from the Bala beds at Waterford, Ireland.

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TOERNQUIST, LEON. Undersökningat ofver Siljansonädets Trilobitfauna, 1896.—Sveriges Geol. Undersökning, Ser. C, No. 66.

Describes and figures a new species, *Cybele adornata;* regards the form of glabella the same as in *Cybele wörthi* and *affinis,* but separates the species on account of the width of its cheeks, the course of the facial suture, and the arrangement of the tubercles.

REED, F. R. COWEER. Quart. Jour. Geol. Soc., Vol. 55, 1899, p. 752.

Describes *Cybele sex-tuberculata* sp. nov.; *C. mchenryi* sp. nov.; from Waterford County, Ireland.

RUEDEMANN, RUDOLF. Trenton Conglomerates of Rysedorph Hill.—Bull, N. Y. State Mus., No. 49, 1901, p. 66.

Decribes a pygidium as *Cybele* sp. Ruedemann remarks that the specimen differs in no essential particular from the pygidia figured by McCoy as *Zethus atractopyge, sexcostatus* and *rugosus,* which are synonyms of *Cybele varrucosa.*

LAMANSKY, M. Die aeltesten Silurischen Schichten Russlands, Etage B, 1905, p. 69.

Notes *C. bellatula* Dalman, and *C. bellatula genuina* Schmidt.

RAYMOND, PERCY E. Carnegie Mus., Vol. 3, 1905, p. 362.—Trilobites of the Chazy Limestone.

Describes *Glaphurus primus* sp. nov. and *Cybele valcourensis* sp. nov. In the same volume, p. 601, he refers both species to *Cybele prima.*. Slocum referred the species to *Cybeloides.*

NARRAWAY, J. E. & RAYMOND, PERCY E. Carnegie Mus., Vol. 3, 1906, p. 598.

Cybele ella sp. nov., an imperfect specimen from Black River limestone, Ottawa, Canada. Slocum referred it to his genus *Cybeloides.*

REED, F. R. COWPER. The Lower Palaeozoic Trilobites of the Girvan District, Ayrshire.—Palaeont. Society, 1906, Part 3.

Describes and illustrates six species, *Cybele bellatula* Dalman; *C. lovéni girvanensis* var. nov.; *Cybele* cf. *aspera* Linrs. (referred to *Cybele michelli* sp. nov. in the supplement to this publication); *C. verrucosa* Dalman?; also two unidentified species, a & b, pl. 17, fig. 5 & 6.

OLIN, E. Om de Chasmopskalk och Trinucleusskiffern Motsvarande Bildningarne i Skäne, 1906.

Referred to one species, *Cybele* cf. *grewingki* Schmidt.

SCHMIDT, F. Rev. 6, Ostbaltischen Silurischen Trilobiten, 1907, p. 17.

Cyeble bellatula Dalman; *C. panderi* sp. nov.; *C. revaliensis* Schm.; *C. rex* Nieszk; *C. grewingki* Schmidt; *C. wörthi* Eichwald; *C. affinis* Schmidt; *C. kutorgae* Schmidt; *C. brevicauda* Angelin?

GUERICH, GEORG. Leitfossilien Kambrium und Silur, Vol. 1, 1908, p. 73, pl. 29, fig. 6.

Cybele bellatula after Schmidt's plates 13 & 15.

SLOCUM, ARTHUR WARE. New Trilobites from the Maquoketa Beds of Fayette County, Iowa.—Field Mus. Nat. Hist., Geol. Series, Vol. 4, No. 3, 1913. Republished, Geol. Sur. Iowa, Vol. 25, 1914.

Describes and figures a new genus, *Cybeloides,* with *C. iowensis* sp. nov. for genotype.

Refers five American species to this new genus, viz.:

Cybele ella N. & R.; *Glaphurus primus* Raymond (*Cybele valcourensis* Raym.); *C. winchelli* Clarke; *Cybele sp.* Rüdemann; *C. iowaensis* sp. nov.

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REED, F. R. COWPER. The Lower Palaeozoic Trilobites of Girvan, Supplement, 1914.

Under *Cybele* the author describes and figures *C. lovéni girvanensis* Reed; *C. bellatula balclatchiensis* var. nov.; *C. michelli* sp. nov. (for *Cybele* sp. b, Reed, Tril. Girvan Dist., p. 130); *C.* cf. *aspera* (Linrs.), Reed, p. 128, of part 3.

RAYMOND, PERCY E. A Contribution to the Description of the Fauna of the Trenton Group.—Geol. Sur. Canada, Mus. Bull. No. 31, 1921.

Cybele spicata sp. nov., from a cranidium.

GENERAL CHARACTERIZATION OF GENERA AND SPECIES.

Order *Proparia* Beecher.

Family Encrinuridae.

Genus *Cybele* Lovén, 1845.

Type *Cybele bellatula* Dalman.

In general the head of forms belonging to this genus is semilunar in outline, and distinguished by its highly elevated frontal margin, as in *Cybele bellatula.*

Glabella rather flat and rectangular when the sides are parallel, but pear-shaped and convex when enlarged towards the front.

Lateral furrows of the glabella distinct, extending to the dorsal grooves and outlining the side lobes when the glabella is flat, or consisting of more or less deep pits or impressions.

Dorsal grooves shallow in those species in which the glabella is enlarged towards the front, but in *Cybele wörthi,* etc., they continue until they disappear among the larger tubercles, to such an extent as to give such species the appearance of *Encrinurus.*

Occipital ring widest in the middle and strongly outlined by deep furrows.

Eye lobes well advanced on the frontal margin in *Cybele bellatula* and *C. coronata;* opposite the center of the cheeks in *C. wörthi, C. brevicauda, C. grewingki, C. lovéni, C. aspera, C. adornata, C. winchelli,* and *C. prima;* far to the rear in *C. affinis, C. revaliensis,* and *C. kutorgae;* opposite the first furrow of the glabella in *Cybele rex, C. tramorensis, C. mchenryi,* and *C. verrucosa.*

The following species have ocular ridges: *Cybele coronata, C. grewingki, C. tramorensis* and *C. mchenryi.*

Ocular ridges extending from the bottom of the frontal lobe of the glabella, in front of the first lateral furrow, to the eyes in most cases: *C. coronata, C. mchenryi, C. sextuberculata, C. tramorensis.*

In *Cybele tramorensis* there rises a low, well marked ridge, slightly in front of the anterior, outer angle of the frontal lobe of the glabella, which runs forward and slightly outward to become a prominent, rounded tubercle, which projects beyond the margin. This marginal tubercle corresponds to the side tubercle of Schmidt's classification, and is present in most of the species of *Cybele,* but wanting in *C. coronata.*

Close beneath the posterior outer slope of the ridge leading up to the side tubercle is a deep, circular pit, the terminal pit of Schmidt's classifi-

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cation. It lies at the anterior end of the axial furrow and is very conspicuous in *C. tramorensis.*

In *Cybele bellatula* the facial suture cuts the posterior margin inside of the genal angle, running thence in a slightly curved line to the eyes and over them at an acute angle to the anterior margin, thence at right angles on both sides of the central tubercle or spine to the rostral shield. This course is typical of the genera *Encrinurus* and *Cromus.*

The hypostoma is oval, with a serrated posterior margin, (see Volborth's fig. 6, pl. 1, of *Cybele bellatula.*) The figure given by Schmidt, pl. 13, fig. 9, of this species represents the anterior wings as larger and obtusely excavated below, while the bordering rim is not very distinct. There are two pairs of oblique, lengthened grooves, one above the other, not continuing to form a coherent groove across the median field of the hypostoma, which is level between them, and without maculae. Nearer the anterior border and close below the wings there is a small, suborbicular dark spot. The surface of the hypostoma is granulated.

The fixed cheeks are usually twice as long as the glabella, with rounded genal angles, (*C. wörthi, C. brevicauda,* etc.) or ending in short spines, (*C. bellatula, C. rex, C. coronata, C. winchelli,* etc.). The free cheeks from quadrants of a circle, with unequal angles and hook shaped projections.

The thorax consists of twelve segments (thirteen in *C. michelli*); pleurae arched, gradually decreasing in breadth, forming bourrelets, but exhibiting on their front edge, up to the knee, a furrow which articulates through the fulcral portion with the peura touching it directly in front; pleurae of the first five body segments ending bluntly, the other seven ending in spines, the sixth segment being the longest and most noticeable on account of the sword-like form which has given its name to *C. bellatula.*

The fifth segment of *C. grewingki* and *C. revaliensis* has similar characteristics.

The pygidium is generally triangular in form, having a conical, jointed axis, with sixteen to eighteen axial joints, with only the first four or five entire and bearing pleurae. *Cybele michelli* has four anterior rings with ten to twelve incomplete ones. The pleurae conform to those of the thorax, five in *C. bellatula,* four or five in *C. rugosa* and *C. winchelli,* while all the other species have four pleurae.

The ornamentation is generally a single row of tubercles on the center of the pleurae, with a double row of lateral tubercles on the axis.

Geological range:

Ordovician.

Geographical range:

Northern Europe:—Sweden, Norway and Russia.

British Isles:—Scotland, Ireland, North Wales.

North America:—Canada, New York, Minnesota and Iowa.

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DISTRIBUTION AND CLASSIFICATION OF SPECIES

The genus *Cybele* Lovén is confined to the Ordovician, and has had about thirty-nine species and varieties referred to it, of which five are now referred to other genera and six to the new genus, *Cybeloides,* leaving only twenty-eight species and varieties in the genus. Of these thirty-nine species and varieties, only thirteen are known from whole specimens, viz:

Cybele kutorgae; C. bellatula; C. verrucosa; C. wörthi; C. grewingki; C. lovéni; C. ovata; C. lovéni girvanensis; C. michelli; C. adornata (pygidium unknown).

Cybeloides winchelli; C. iowensis; C. ella.

There are sixteen Northern European species and varieties, viz:

Cybele bellatula Dalm., Om Palaed., 1826, p. 228, B, 2b, B. 3a, Llandeilo.

" *verrucosa* Dalm., Om Palaed., 1826, p. 134, Bala, Lower Llandeilo.

" *dentata* Esmarck, Mag. Naturv., Vol. 1, p. 269, pl. 7, fig. 10, Reg. D-E.

" *brevicauda* Ang., Pal. Scand., 1854, p. 86, pl. 41, fig. 14, E. F. 1, Upper Ordovician.

" *aspera* Linrs., Sv. Vet. Akad. Handl., Vol. 6, No. 2, p. 62, pl. 1, fig. 11-13, Beyrichian Kalk, Middle Ordovician.

" *lovéni* Linrs., Sv. Vet. Akad. Handl., Vol. 8, 1869, p. 63, pl. 1, fig. 14, Chamopskalk, Middle Ordovician.

" *adornata* Törnquist, Sv. Geol. Under. ser. C. No. 66, p. 25, pl. 1, fig. 20, 21, Chamopskalk, Middle Ordovician.

" *bellatula wöhrmanni* Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 101, text fig. B. 3b.

" *wörthi* Eichwald, Sil. Syst. Estl., 1840, p. 70, C. 1a, C. 1b. Middle Ordovician.

Zethus rex Nieszkowski, Monog. Baltic Tril., p. 614, pl. 1, fig. 3, C. 2, C. 3.

Cybele affinis Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 216, pl. 13, fig. 18, 19, C. la.

" *revaliensis* Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 207, pl. 13, Fg. 20; pl. 14, fig. 6; pl. 16, fig. 6, 7; pl. 16, fig. 40, C. 1b.

" *grewingki* Schmidt, Rev. 1. Ostb. Sil. Tril., 1881, p. 211, pl. 14, fig. 1, 2, C. D. 2.

" *coronata* Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 213, pl. 13, fig. 24-27; pl. 14, fig. 5; pl. 15, fig. 10, C. 2.

" *kutorgae* Schmidt, Rev. 1, Ostb. Sil. Tril., 1881, p. 217, pl. 15, fig. 11-14; pl. 16, fig. 39a, b, fig. 12; text fig. C. 3. D1. D2.

" *panderi* Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 19, B. 3a, B. 3b, C. 1a.

The British Isles have thirteen species and varieties, viz:

Cybele arenosa McCoy, Sil. Foss. Ireland, 1846, p. 40, pl. 4, fig. 12, Bala.

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" *verrucosa* Dalman, Bala & Lower Llandovery.
" *rugosa* (Portlock), Geol. Londonderry, p. 302, pl. 5, fig. 1 (as Ogygia), Lower Llandovery.
" *lovéni girvanensis* Reed, Tril. Girvan, p. 126, pl. 17, fig. 1-4, Upper Bala.
" *bellatula* Dalman, Llandeilo.
" *mchenryi* Reed, Quart. Jour. Geol. Soc., Vol. 55, p. 757, pl. 49, fig. 7, Bala. This may be the cephalon of *C. rugosa.*
" *sextuberculata* Reed, Quart. Jour. Geol. Soc., Vol. 55, p. 752, pl. 49, fig. 8, Bala.

Zethus atractopyge McCoy, Referred to *Cybele verrucosa.*

Cybele tramorensis Reed, Geol. Mag. Decade 4, Vol. 2, p. 48, pl. 7, fig. 1, Bala.
" *bellatula balclatchiensis* Reed, Suppl. Tril. Girvan, 1914, p. 41, pl. 7, fig. 7, Llandeilo.
" *michelli* Reed, Suppl. Tril. Girvan, 1914, p. 42, pl. 7, fig. 7, Upper Ordovician.
" *connemarica* Reed, Quart. Jour. Geol. Soc., Val. 65, 1909, p. 146, pl. 6, fig. 6, 7, Lower Ordovician.
" *ovata* Etheridge, Mem. Geol. Sur. Lake Dist., 1876, p. 112, Skiddaw Slates, Lower Ordovician.

North America and Canada have seven species, viz:

Cybele ella Narraway & Raymond, Ann. Carnegie Mus., Vol. 3, 1906, p. 596, Black River, Lower Ordovician.

Cybeloides iowensis Slocum, Field Mus., Geol. Ser., Vol. 4, No. 3, 1913, p. 63, pl. 16, fig. 1-4.

Cybele mira Billings, Pal. Foss. Canada, Vol. 1, 1865, p. 292, fig. 282 (pygdium only), Trenton.
" *spicata* Raymond, Geol. Sur. Canada, Mus. Bull. No. 31, 1921, p. 34, pl. 11, fig. 1, Cottingwood Limestone, Middle Ordovician.
" *prima* Raymond, Ann. Carnegie Mus., Vol. 2, p. 562, pl. 14, fig. 7, 8, Chazy Group.
" *winchelli* Clarke, Geol. Minnesota, Vol. 3, 1888, p. 742, text fig., Galena Limestone.
" *sp.* Ruedemann, Bull. N. Y. State Mus., No. 49, 1901, p. 66, Trenton.

Slocum referred all these species to his new genus *Cybeloides.*

The following six species are known only from fragments of the head: *Cybele affinis; C. coronata; C. mchenryi; C. sextuberculata; C. arenosa; C. tramorensis.*

The following nine species and varieties are known from the head and tail only: *Cybele brevicauda; C. rex; C. revaliensis; C. kutorgae; C. rugosa; C. aspera; C. bellatula balclatchiensis; C. lovéni girvanensis; C. prima.*

The following three species are known from the pygidia only: *C. mira; C. dentata; C. connemarica.*

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Species with five pairs of pleurae in the pygidia:—*Cybele bellatula; C. rugosa; C. winchelli.*

Species with four pairs of pleurae in the pygidia:—*Cybele wörthi; C. verrucosa,* etc.

The following species are of the type of *Cybele bellatula* with three or more spines on the anterior margin of the cephalon:—*Cybele bellatula; C. rex; C. aspera; C. coronata; C. tramorensis; C. prima; C. sextuberculata; C. winchelli; C. panderi; C. bellatula balclatchiensis; C. michelli C. spicata.*

The following species are of the type of *C. verrucosa* Dalman, with the anterior margin of the head ornamented with one or more rows of tubercles:—*Cybele verrucosa; C. wörthi; C. adornata; C. affinis; C. prima; C. ella; C. brevicauda; C. revaliensis; C. kutorgae; C. dentata* (Boeck); *C. mchenryi; C. lovéni; C. lovéni girvanensis.*

In the folowing species the pleurae of the sixth or seventh segment is prolonged into a spine; generally the four anterior segments end bluntly and the posterior eight in long spines. The specific name *Bellatula* comes from its sword-like pleural extension. As far as known, the species with this characteristic are:—*Cybele adornata; C. bellatula; C. brevicauda; C. lovéni; C. lovéni balclatchiensis; C. lovéni girvanensis; C. ella; C. wörthi; Cybeloides iowensis.*

Dr. Schmidt adopted the following classification:

Group 1. With five pleurae in the pygidium and only one tubercle on the frontal ridge in front of the glabella:—*Cybele bellatula.*

Group 2. With four pleurae in the pygidium and a greater number of spines and tubercles on the frontal ridge in front of the glabella; glabella markedly broadened towards the front, with scattered tubercles:—*Cybele wörthi; C. affinis; C. kutorgae; C. brevicauda.*

Group 3. Glabella not widened in front, with three or four spines or tubercles in front of the glabella:—*Cybele revaliensis; C. rex; C. grewingki; C. coronata; C. aspera; C. verrucosa; C. dentata; C. lovéni.*

A classification based on the thoracic segments:

Group 1. Of the type of *Cybele verrucosa.*

Thorax with twelve segments of equal length; galabella wide in front, narrowing towards the base; pygidium rectangular; axis of twenty joints; pleurae on the first four axial rings only.

Group 2. Of the type of *Cybele bellatula.*

Thorax of twelve segments, the pleurae distinguishing this group from all others; first four or five pleurae twice as wide as the others and ending bluntly, the other eight or seven gently bent to the rear and terminating in long, pointed spines; glabella with three pairs of side furrows, nearly cylindrical from the base to the first furrow, and clavate from this point; pygidial axis with fifteen to eighteen joints, only the first five or six entire, the rest being notches at the sides; lateral lobes with five pairs of pleurae.

Group 3. Glabellar furrows represented by pits.

Most of the Russian species of *Cybele* have sharply impressed glabellar furrows with the exception of *C. grewingki, C. kutorgae* and *C.*

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revaliensis, but this characteristic is well represented in the American species and is considered of generic value for the genus *Cybeloides* by Field.

DIAGNOSES OF SPECIES.

Cybele adornata Törnquist.

Sveriges Geol. Undersökning, Ser. C, No. 57, 1883, p. 25, pl. 1, fig. 20, 21.

Head semilunar, more than twice as broad as long, with rounded genal angles; glabella, at the neck furrow, occuying 1/5 to 1/6 of the width of the head, having the lobed part nearly parallel-sided, then suddenly widening to form the front lobe; the three glamellar furrows short, of equal length, and directed a little backward; side lobes of equal size and almost of equal form, the unlobed median portion between them occupying more than half the breadth of the glabella; axial grooves deep, at some distance from the anterior margin of the head, forming almost right angles with the glabellar front border furrow, which is not evenly bent, but forms a broken line composed of three straight parts, thus giving a hexagonal shape to the front lobe of the glabella; head border having a distinct marginal furrow which, above the eyes, bends itself from the border backward and inward to join the angles between the axial furrow and the front border of the glabella; raised seam beyond the border furrow quite broad, particularly where the faint sutures reach the corner of the head; cheeks, thus bordered by the axial furrows and the marginal furrows, exhibiting almost the form of fish bladders; cheeks sloping steeply inward towards the axial grooves, but slowly outward; eyes located near the glabella, somewhat nearer the occipital than the frontal furrow; surface of the glabella covered with large and small tubercles, with probably five pointed knobs located in front of it near the head furrow, which are distinguished from the other tubercles of the head by their height compared with their circumference, and by having their tops perforated; other groups of nodes on the thickened margin outside the facial sutures becoming smaller and disappearing towards the genal angles.

Thoracic axis very convex, (in my specimen somewhat compressed laterally, so that the proportion of its width to that of the pleurae cannot be given); pleurae directed straight outward near the axis, while their ends are bent backward; pleurae of the sixth segment distinguished from the others by their greater length and their continuous breadth, the amount by which these pleurae exceed the others in length not having been noted; entire thorax exhibiting a shagreen, granulated surface without tubercles.

Pygidium unknown.

Length of head 14, width 34, greatest width of glabella 10, least width 6 m m.

Sweden, Kärgade Fauna, Chamopskalk. (Middle Ordovician).

This species approaches *C. wörthi* and *C. affinis* in the form of the glabella, but it is distinguished from both by the width of the cheeks, the course of the facial suture, and the arrangement of the tubercles. Behind the eyes the facial sutures run straight to the outer margin of the head, and parallel to the posterior margin; in front of the eyes they diverge very little

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until they reach the intramarginal furrow, then they again converge so as to cut the anterior border on either side of the row of great tubercules in front of the glabella.

Cybele affinis Schmidt.

Mem. Acad. Imp. Sci., Ser. 7, Vol. 30, p. 216, pl. 13, fig. 18, 19.

This species is similar to *C. wörthi* Eichwald, but the eyes are further back, opposite the second lateral furrow of the glabella. The furrow of the limb appears in front of the ridge of the limb on the upper side, so that it is visible from above and not from below, as in other species of *Cybele*.

From Pawlowsk, probably belonging to the Echinosphaerite Chalk. B/3b. (Middle Ordovician.)

Cybele arenosa (McCoy, 1846).

Calymene arenosa McCoy.

Synopsis Sil. Foss. Ireland, 1846, p. 47, pl. 4, fig. 12, cranidium.

Cybele arenosa Bigsby, Thesaurus Siluricus, 1868, p. 47.

Glabella with three pairs of lateral lobes, elongate, oval, convex, the base much contracted and rounded, the dorsal furrows deep, tuberculated; cheeks very wide, gently convex, triangular, each cheek exceeding the length of the glabella by about one-half its width; eyes at the height of the upper cephalon tubercle, rather less than their own diameter from the glabella; entire surface of the cranidium ornamented as if sanded, very minutely granulated, with larger, sharp, scattered tubercles of extremely irregular size and distribution.

Cranidia small, length 4, (reaching 10), width 16 mm.

Ballygarvan Bridge, New Ross, County Wexford; abundant in Slates of Greenvile, Enniscorthy; Ireland. Ordovician Bala (Upper Ordovician).

Cybele aspera Linnarsson.

Sv. Vetensk. Akad. Handlingar, Vol 8, No. 2, p. 62, pl. 1, fig. 11-13, 1869.

Described from the head and tail.

Cf. *Cybele aspera* (Linnarsson) Reed, Tril. Girvan Dist., 1903, p. 128, pl. 16, fig. 12, 13.

Breadth of head 2½ times greatest length; surface with numerous tubercles; glabella elevated, clavate; frontal lobe almost semicircular; side lobes small, sloping, separated by deep, oblong pits; tubercles covering the glabella varying in size, the largest arranged in two parallel rows near its middle; glabella bordered at the front by broad, shallow grooves, armed with a row of five spines with a lateral tubercle on each side; dorsal grooves broad, diverging, slightly bent, with the convex side inward, having a deep, rounded pit on each side at their anterior part; occipital groove shallow, near the dorsal grooves, having a deep depression on each side.

Cheeks convex, armed posteriorly with a row of spines or teeth, inwardly bordered by a deep and broad furrow; genal angles rounded off; eyes located nearly opposite the frontal lobe of the glabella, the stalks only

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visible in the smaller specimens; free cheeks having a broad border ornamented with tubercles.

Thorax imperfectly known, the segments not ornamented by rows of tubercles, the eighth pleura enlarged at the fulcrum point.

Pygidium rectangular; axis with eighteen axial joints with four rows of nodes, the first seven joints only extending entirely across, the others notched at the sides; pleurae four, running almost parallel with the axis; ends free.

Beyrichiakalk, Mosseberg, Ponstorp, Sweden.

Reed, (Trilobites of the Girvan District) remarks that the glabella has three pairs of deep lateral pits which are not containued into the dorsal furrows, and these incompletely mark off three pairs of lobes as in *C. aspera,* whereas, in *C. verrucosa* there are true furrows.

Balclatchie Group, (Llandeilo) Ardmillan, Dow Hill, (Middle Ordovician).

Reed finally referred the English species from the Girvan District to *Cybele michelli* sp. nov. in his Supplement to the Trilobites of the Girvan District.

Cybele bellatula (Dalman, 1826).

Calymene? bellatula Dalman, 1826, Svensk. Vet. Akad. Handl., p. 228, pl. 1, fig. 4a-d.

" " Dalman, Om Palaead., p. 328, pl. 1, fig. 4a-d. 1828.

Zethus verrucosus Pander, 1930, Beiträge Geol. Russ., p. 140, pl. 5, fig. 6; pl. 40, fig. 4, equals *Cybele panderi* Schmidt.

Calymene bellatula Hisinger, 1837, Leth. Cuec., p. 11, pl. 1, fig. 5a, b.

Cryptonymus parallelus Eichwald, 1840, Sil. Schicht. Syst. Estl. p. 93.

Cybele bellatula Lovén, 1845, Ofvers. k. Sv. Vet. Akad. Forhandl., p. 111, pl. 2, fig. 3.

" " Corda, 1847, Prodrom., p. 90, pl. 5, fig. 33.

Zethus verrucosus Volborth, 1848, Verhandl. Russ. Min. Ges., 1847, p. 8, pl. 1, fig. 5-7.

" *bellatula* Barrande, 1852, Syst. Sil. Bohem., Vol 1.

Cryptonymus bellatula Angelin, 1852, Palaeont. Scand., p. 3, pl. 4, fig. 1-3; also p. 89.

Zethus verrucosus Hoffmann, 1858, Verhandl. Russ. Min. Ges., p. 32, pl. 3, fig. 4.

Cryptonymus bellatula Eichwald, 1860, Leth. Ross., p. 1414.

" *parallelus* Eichwald, 1860, Leth. Ross., p. 1417.

Cybele dentata Kjerulf, 1865, Veiviser, etc., p. 6, (not *Tril. dentatus* Esmarck.)

Cryptonymus (*Cybele*) *bellatula* Vogdes, 1878, Monog. Genera *Zethus,* etc., p. 31, pl. 2, fig. 1, (copy of Angelin's figure.)

Cybele bellatula Schmidt, Rev. Ostb. Sil. Tril., pt. 1, p. 203, pl. 13, fig. 9-13; pl. 15, fig. 1-5.

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Cybele bellatula Brögger, 1882, Die Sil., Etag. 2 and 3, p. 136, pl. 6, fig. 2a, b.

" " Roemer, 1885, Lethaea Erratica, p. 52, pl. 3, fig. 9.

" " Wigan, 1888, Zeitschr. Deutsch. Geol. Ges., p. 88, pl. 10, fig. 15.

" " Lindström, 1901, K. Svensk. Vet. Akad. Handl., No. 34, p. 52, pl. 4, fig. 2.

" " Reed. 1906, Tril. Girvan Dist., p. 123, pl. 16, fig. 14-17.

" " *wöhrmanni* Schmidt, 1907, Rev. 6, Ostb. Sil. Tril., p. 101, text fig. 11, 11a.

" " Gürich, 1908, Leitfossilien Kambrium und Silur, p. 73, pl. 27, fig. 5, 5a.

" " *balclatchiensis* Reed, 1914, Lower Pal. Tril. Girvn, Suppl., p. 41, pl. 7, fig. 6.

Head semilunar, twice as wide as long, with obtuse genal angles and a wide, thick marginal border ornamented with large tubercles; frontal margin armed with three short spines.

Glabella with three side furrows, nearly cylindrical from its base to the first furrow, and from this point the clavate surface covered with large tubercles; cheeks convex, separated from the glabella by deep and wide dorsal grooves; free cheeks bent gently downward; facial suture commencing on the outer margin of the head above the genal angles, running over the eyes, which are located well to the front on elevated pedicles, and there converging at the front of the glabella to the outer margin at a right angle to the rostral shield; occipital ring very convex, marked in the center by a tubercle (Volborth's figure shows a row of tubercles).

Thorax with twelve segments (plèvre á bourrelet); pleurae distinguishing this genus from all others, the first five being twice the width of the other seven, and gently bending to the rear, terminating in rounded ends; the sixth pleura wide, bending to the rear until it reaches the fulcrum point, then enlarging and bending suddenly at a right angle to the rear and running parallel with the axis, until it ends in a long, pointed spine; the other pleurae conforming to this one and gradually diminishing in size.

Pygidium with five pleurae; axis ending in a point and having fifteen to eighteen axial joints, the first five or six entire, the others notched at their sides; first four pleurae running almost parallel to the axis, the last pair united at their extremities, and joined beyond the termination of the axis; pleurae ornamented by a central row of tubercles; hypostoma oval, with two side wings; anterior wings large and obtusely excavated below, the border rim not distinct; two pairs of oblique, lengthened grooves in the center, one above the other; surface granulated; a small, rounded, dark spot near the anterior border, close below the wings.

Ostergotland, Husbyfjol, Sweden; Wesenburg, Russia. B/2a, B/3a. (Middle Ordovician).

The species is rare in Sweden but common in Russia.

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Cybele bellatula wöhrmanni var. nov.

Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 101, fig. 11, 11a, Abänderung bei Archangelskje am Wolchow, B/2b. (Middle Ordovician).

Cybele brevicauda Angelin, 1854, Palaeont. Scand., p. 89, pl. 41, fig. 14.

Zethus brevicauda Nieszkowski, Monog. Trilobit., p. 617.

Zethus bellatula Nieszkowski, Monog. Trilob., p. 613, (ex parte).

Zethus atractopyge Nieszkowski, Mong. Trilob., p. 616.

Encrinurus sexcostatus Nieszkowski, Monog. Trilob., p. 610, (not Salter).

Cybele brevicauda Schmidt, 1881, Mem. Acad. Imp., Ser 7, Vol. 30, p. 219, pl. 11, fig. 23; pl. 14, fig. 7-10; pl. 15, fig. 15-17.

Cryptonymus (*Cybele*) *brevicauda* Vogdes, 1878, Monog. of Genera *Zethus, Cybele,* p. 33.

Head semilunar, strongly convex, twice as broad as long, with deep dorsal grooves; glabela pear shaped, longer than wide; frontal lobe strongly arched, occupying more than one-half the entire length of the glabella; surface of the glabella covered closely with large and small tubercles, six or seven of which, at its anterior margin, form a circle which is separated from the rest of the glabella by a faint furrow; a larger tubercle on each side of this circle, and not separated from it by any space, which corresponds to the side tubercle in other species; lateral glabellar furrows indistinctly indicated and disappearing among the larger tubercles; neck ring well developed and raised over the back of the glabella.

First five segments of the thorax ending in blunt points, the sixth with a long extension bending to the rear.

Pygidium broadly oval, as long as broad, the axis, with sixteen joints, ending in a triangular point which is enclosed by the inner pleural ends; pleaurae four, ending in short, blunt ends; the axis with some small tubercles in pairs in the obliterated central portion.

Description drawn from heads and pygidia from Neuenhof, near Hapsal, Russia. The original description of the species was made by Angelin from a pygidium from Reg. D-E, Dalecarlia, in which he represents a tail with sixteen axial joints, the first three extending across it, and four pairs of pleurae of equal length.

Nieszkowski remarks (p. 617, Mong. of Trilob.) that, in the Silurian of Scandinavia and in Esthonia, only the tails of this species have been found; that only the first four axial joints are entire, these having long pleurae bending backward as in the other species of the genus *Zethus;* that the other joints are narrow rings and grow together, forming an obtuse conical end; that on the axis there are two rows of very faintly defined tubercles, with no tubercles on the pleurae.

Schmidt classes this species in his second group, which has four pleurae in the tail, with five spines at the frontal margin of the head, in front of the glabella.

Sweden, Esthonia, E. F/1, Bala; Upper Ordovician.

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Cybele connemarica Reed, 1909.

Quart. Jour. Geol. Soc., Vol. 65, 1909, p. 146, pl. 6, fig. 6, 7.

Pygidium subpentagonal, as wide as long, gently convex; lateral lobe bent down slightly in front and steeply behind; axis conical, tapering rather rapidly at about thirty degrees, obtusely pointed, annulated throughout, more than a third of the width of the pygidium at the anterior end and extending three-fourths of its length, composed of twelve or thirteen complete rings separated by strong, equal furrows, with traces of lateral nodules on the rings; dorsal furrows well marked; a narrow, elongate, post-axial piece extending from the tip of the axis to the posterior margin of the pygidium.

Lateral lobes with nine or ten pairs of pleurae, of which the first three are subequal in size and the rest successively decreasing in size and strength, the ninth being very slender and short and lying close against the last three or four rings of the axis, but not extending behind its tip; faint traces of a smaller, linear tenth rib are occasionally visible.

The first pleurae bending back strongly at about a third of their length, thus arching backward almost parallel to the axis and reaching as far as the tip; the following pleurae less strongly curved and becoming successively straighter and subparallel to the axis, finally curving slightly inward posteriorly; the last five pairs of pleurae ending in free, obtuse, short points on the margin and separated by strong interpleural furrows, finally curving inward to meet in the middle line behind the post-axial piece; the other four or five pleurae enclosed and not reaching the margin, but ending weakly against the sides of the post-axial piece; a narrow, anterior band occasionally visible on the anterior edge of the first three pleurae, but usually they appear to be simple and unfurrowed.

Surface of pygidium granulated, with a few irregularly disposed tubercles on the pleurae; length 8 mm., width 8 mm.

Tourmakeady District, Gortbunacullin, &c., Arenig. (Lower Ordovician).

The species seems to be allied to *Cybele bellatula,* but the complete condition of the axis rings and their much smaller number, as well as the different characters of the pleurae of the axial lobes, mark it off.

Cybele coronata Schmidt, 1881.

Rev. Ostb. Sil. Tril., Phacopiden, Cheiruriden, und Encrinuriden, 1881, p. 213, pl. 13, fig. 24, 27; pl. 14, fig. 5; pl. 15, fig. 10.

Cybele coronata Wigan, 1888, Zeitschr. d. Duetsch. Geol. Ges., 1888, p. 89, pl. 10, fig. 16.

Dorsal grooves very flat, glabella drawn forward in a decided arch, so that the length of the frontal lobe takes up more than half the length of the whole glabella; side furrows of the glabella strongly indented, but not extended to the dorsal grooves; five long spines in front of the glabella extending for ten millimeters and forming a crown which occupies the whole frontal margin; the isolated side tubercles, prominent in other species, wholly wanting, but the groove usually lying behind them, at the end of the dorsal groove, is present, but rather shallow, and lying at a lower

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level than the rest of the furrow; ocular ridge strongly developed, jutting out horizontally and running parallel with the posterior margin on both sides, with a number of depressed points alongside the bottom of the ridge; eyes located the width of the glabella from the dorsal groove and on a level with the first lateral gabellar furrow; cheeks similar to those of *Cybele rex,* less than twice as wide as the glabella, and but slightly raised towards the eyes; descending sharply towards the outer edge; surface of the cheeks with scattered tubercles, and covered with finely indented impressions, but still without the rough surface of *Cybele rex;* free cheeks with a well developed limb, marked by prominent tubercles, and very closely resembling those of *Cybele rex.*

Pygidium, like that of *C. rex,* broad oval, rather flat, as long as broad. the axis with sixteen or seventeen joints, of which only the anterior four extend across; triangular tip of the axis bent downward and split at the end; ends of the pleurae free, elongated, pointed and somewhat diverging; a few tubercles on the center of the axis and on the pleurae.

Estland, C/2. (Llandeilo) Middle Ordovician.

This species is found, though not entire, together with *Cybele rex,* to which it is related, though with distinct differences.

Cybele dentata (Esmarck, 1833).

Om nogle nye Arter af Tril.—Mag. for Naturvidensk. ander Rakkes, Christiania, Vol. 1, 1833, p. 269, pl. 7, fig. 10, as *Trilobites dentatus.*

The author illustrates a pygidium with seventeen or more entire axial rings and four pairs of pleurae terminating in spines.

Trilobites dentatus Boeck, Uebersicht der bischer in Norwegen gefundenen formen der Trilobiten Familie, 1838, p. 139, No. 8; also *T. plicatus,* p. 140, No. 12.

The author gives a description of the cephalon in which the semicircular glabella, which is rounded in front, has three pairs of lateral furrows, and genal angles terminating in elongated spines.

Cybele dentata Kjerulf, 1865, Veiviser, p. 6.

Brögger, Die Sil. Etage 2 and 3, p. 136, referred this to *Cybele bellatula.*

Cybele dentata Angelin, Palaeont. Scand., 1854, p. 89, pl. 41, fig. 12.

The author's description is very brief.

Pygidium smooth; axis marked with about seventeen rings, obliterated in the middle.

Reg. D-E, Norway, Christiania. (Upper Ordovician.)

The figure shows four pairs of pleurae not extended beyond the tip of the axis; the first four axial rings are entire and bear pleurae, the others being notched at the sides of the axis.

Cryptonymus (*Cybele*) *dentatus* Vogdes, 1877, Monog. Genera *Zethus, Cybele,* etc., p. 33.

Trilobites dentatus Burmeister, H. Organ. Tril., English Ed, 1846, p. 119, No. 5.

The author refers to Esmarck's, and also to Boeck's description of this species. He refers *T. dentatus* (Boeck) to *Phacops,* of the division

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B/d, and approximates it to *Phacops arachnoides,* remarking: "From these statements there appears now to be scarcely a doubt that it belongs to Dr. Lovén's new genus *Cybele.*"

Cybele ella Narraway & Raymond.

Ann. Carnegie Mus., Vol. 3, p. 598, fig.

Described from an imperfect specimen from Black River Limestone, Ottawa, Canada.

Head short, very wide; glabella narrow, convex; cheeks depressed, convex, lower than the glabella; length of head 4, width 12 mm.; glabella narrow, expanding towards the front, with three furrows represented by three pairs of pits, the second and third pits on each side united into a long depression parallel with the axis; behind the third pair a pair of rather deep pits in line with the neck furrow; leading diagonally forward and outward from the pits are narrow depressions which bound the rear ends of the side lobes of the glabella: surface with five pairs of tubercles; genal angles with short spines.

Thorax with twelve segments, the sixth a little wider and more prominent than the others, (the specimen does not show the ends of the pleurae).

Pygidium very small, about as wide as long; pleurae four pairs of double ribs; axial joints sixteen, notched at the sides and with a double row of tubercles.

Length 14, width 12 mm.

The authors compare the species with *C. prima* from the Chazy.

Cybele sp. Ruedemann, 1901.

Bull. 49, N. Y. State Mus., 1901, p. 66, pl. 4, fig. 12.

Cybele prima (Raymond), as *Glaphurus primus,* Ann. Carnegie Mus., Vol. 2 p. 362, pl. 14, fig. 7, 8.

Cybele valcourensis Raymond, Ann. Carnegie Mus., Vol. 2, p. 362 pl. 14, fig. 9.

Described from the head and detached free cheeks, Chazy, Valcour, N. Y.

Head short, broad, with a wide glabella which is moderately convex; glabellar furrows short and turned backward; second pair running into the third pair and the third pair joining the neck furrow; surface tuberculated; fixed cheeks very convex; free cheeks pitted all over except below, and a little in front of the eyes, where there is a group of small tubercles.

Pygidium described as *C. valcourensis,* from five miles south of Plattsburgh, N. Y.

Pygidium narrow, tapering to a point; axis narrow, but not extended to the posterior end, with the first joint entire and fourteen to eighteen joints notched at the sides; pleurae five pairs of double ribs which turn back nearly parallel with the axis, each rib consisting of a smaller anterior, and a larger posterior portion, and ending in short, rounded spines, which extend a short distance behind the border; axis with five pairs of nodes.

Canada, Black River Group, Ontario near Ottawa. Lower Ordovician.

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An imperfect tail was described by Ruedemann, Bull. N. Y. State Mus., No. 49, p. 66, pl. 4, fig. 12, from a pebble of Rysedorph Hill, which seems to belong to this species.

In this species all the pits of the glabella are connected, but in *Cybele clla* only the second and third pits are connected, though it is probable that both belong to the same species.

Slocum refers these species to Cybeloides.

Cybele grewingki Schmidt, 1881.

Rev. Ostb. Sil. Tril., Phacopiden, Cheiruriden & Encrinuriden, 1881, p. 211, pl. 14, fig. 1, 2; fig. 11, in text.

Cybele grewingki Wigan, 1888, Zeitschr. d. Deutsch. Geol. Ges., 1888, p. 89, pl. 10, fig. 17.

Cybele grewingki Olin, Om de Chasmopskalken & Trinucleusskiffern, p. 49, 1906.

Cybele grewingki is much larger than *C. rex,* the glabella is the same in outline, but more convex, and it has five blunt tubercles in front of the glabella, whereas *C. rex* usually exhibits spines. The cheeks are similar to those of *C. rex,* but the eyes are moved back to a level with the second glabellar furrow. In the thorax the fifth segment is strongly developed instead of the sixth as is usual in the genus *Cybele.*

The pygidium is more elongated than in *C. rex.* It is pear-shaped, much contracted at the end, about one and one-sixth times as long as broad. The axis has eighteen joints, the front four being entire, the rest notched at the sides. The pointed triangular end of the axis is pushed between the inner pleural ends which barely touch one another.

The four pleurae terminate in blunt pointed ends, are flatly arched and show indistinct rows of tubercles on the surface as in *C. revaliensis.*

Length of the head 27, breadth 70 mm.; length of pygidium 24, breadth 20 mm.

St. Mathias.

Russian species, C/2, D/1, D/2. St. Petersburg & Estland. (Middle Ordovician, Llandeilo, Utica.)

Cybele kutorgae Schmidt, 1881.

Mem. Acad. Imp. Sci., Ser. 7, Vol. 30, p. 217, pl. 15, fig.11-14; pl. 16, fig. 39a, b.

Cybele kutorgae Wigan, 1888, Zeitschr. d. Deutsch. Geol. Ges., 1888, p. 89, pl. 10, fig. 17.

Cybele kutorgae Olin, 1906, Lunds Geol. Haltulb. Ser. B, No. 4, p. 49.

Head broad and short, rounded broadly in front, about 2½ times as broad as long; dorsal grooves deep, plainly separate in front, and showing the end grooves distinctly; glabella trapezoidal, arched slightly, convex in front; frontal lobe less than half as long as whole glabella, its front breadth being from one and a quarter to one and a fifth that of the bas[illegible] glabella.

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The first four segments of the thorax with rounded terminations to the pleurae, the sixth pleurae terminating in extended spines, the other pleurae diminishing in size so that the width of the axis of the twelfth segment is less than half that of the first segment.

Pygidium broadly uniform, blunt, approaching that of *C. wörthi;* axis with sixteen joints, of which only the first four extend across it, and with four tubercles in pairs in the central portion; termination of the axis a short, triangular point, which is overtopped by the pleural ends of the fourth pair.

Reval, Mölokowizy, etc., Russia. C/2, D/1, D/2. (Llandeilo). (Middle Ordovician.)

The species is similar to *Cybele wörthi,* and belongs to the same group, but it is more nearly allied to *Cybele brevicauda Ang.,* and is possibly its immediate predecessor.

Cybele mchenryi Reed, 1899.

Quart. Jour. Geol. Soc., Vol. 55, p. 757, pl. 49, fig. 7.

Head semilunar, twice as broad as long, genal angles rounded; glabella cylindrical, nearly parallel sided, slightly convex anteriorly and obtusely pointed, with three pairs of slightly oblique lateral furrows; frontal lobe large, obtusely pointed in front; occopital ring marked off by a strong neck furrow, widest in the center; fixed cheeks wide, convex, with genal angles rounded; eyes located about one-third of the width of the glabella from the dorsal furrows and opposite the second glabellar furrow; ocular ridge running from the first glabellar furrow to the eye; posterior branches of the facial suture running almost to the posterior margin of the head; anterior branches curving inward and forward to the anterior margin of the head; ornamentation consisting of scattered tubercles of various sizes, but none very small.

Length of the head 7, width 14 mm; length of the glabella 5, width 4 mm.

Described from the head only, taken near Newton Head, County Waterford, Ireland.

C. verrucosa has a different glabella, as also *C. wörthi,* but this species may prove to be the same as *C. rugosa.*

Cybele lovéni Linnarson.

Kongl. Sv. Vetensk. Handl., Bd. 8, No. 2, p. 63, pl. 1, fig. 14.

Described from an entire specimen.

Head about three times as broad as long; genal angles spined, extending beyond the third segment; marginal border prominent; glabella flattened, its sides parallel, pentagon shaped; furrows three, the rear two deep, almost rounded depressions, not extending to the dorsal grooves; front furrows oval, directed obliquely to the front; glabella ornamented with tubercles; occipital ring higher than the glabella, separated by a shallow furrow which has a deep cut in its outer ends, elevated in the center where there is a large node flanked on each side by several smaller tubercles; dorsal grooves of medium depth where the side furrows of the

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glabella end towards the front, with a depression in front of this, and passing into furrows which surround the anterior end of the cheeks; fixed cheeks slightly convex, tuberculated; genal angles prolonged into spines which extend to the third and fourth thoracic segment; eyes very close to the glabella, twice as near the posterior border as the anterior edge, with a ridge running obliquely from the dorsal grooves backward to the base of the eye stalks; anterior branches of the facial suture bordering the glabella, forming almost a right angle at the eyes, and extending to the rear with a slight bend to the outer edge of the head which they cut immediately above the base of the genal angles; limb broad and prominent where it borders the sides and posterior margins, but narrow in front of the glabella; three tubercles showing in the illustration on each side of the dorsal grooves.

Thorax with twelve segments, occupying two-fifths of the whole length; axis convex, sides parallel in front for about half its length, then narrowing suddenly to a point on the pygidium; pleurae a borrelet, the greater part of each pleura consisting of an elevated moulding with a smaller border edge in front, which is separated from it by a groove, and a narrower groove behind it; the four anterior pleurae directed almost straight outward, free ends short and bent backward on the third and fourth segments; sixth pleurae very much longer than the others, their points more bent; first five thoracic segments with a row of tubercles on the axis and one or more on the inner part of the moulding of the pleurae; the other segments smooth.

Pygidium one-third the length of the body, elongated, narrowing towards the rear; axis with eighteen joints notched at the sides; axis of the tail flattened; pleurae four pairs, each divided into two parts by a groove that is ornamented by a row of pits; the two anterior pleurae with free ends, the last pair united in a caudal mucro with three terminal points.

This species occurs in *Trinucleus* Schist on Fardalaberget Sheep Mt. Valley at Hogstenaberget, etc., West Gotland. (Upper Ordovician.)

The author compares this species with *C. rugosa,* of which only the tail is known, and that imperfectly. The latter has about twenty-eight axial joints and the tail ends in four or five points.

Cybele lovéni girvanensis Reed, 1906.

Tril. Girvan Dist., Palaeont. Soc., 1906, p. 126, pl. 17, fig. 1-4.

Cybele rugosa Armstrong & Young, 1876, Cat. West Scot. Foss., p. 16.

Cybele rugosa Nicholson & Etheridge, 1878, Mon. Sil. Foss. Girvan, fasc. 1, p. 112, pl. 14, fig. 13; pl. 8, fig. 5-7.

Cybele rugosa ? 1899, Mem. Geol. Sur. Sil. Rocks Brit., Vol. 1, Scotland, pp. 672, 688.

There are a few minor points in which the Girvan specimens differ from the Swedish *Cybele lovéni* and they are sufficient to indicate a definite variety. The characters of the head shield agree exactly with those of *C. lovéni* except in the presence of a small projecting knob in front of the glabella. The glabella does not increase in width anteriorly, but is parallel-sided, the fused lateral lobes of the glabella forming a rather narrower zone on each side. The thorax agrees in all respects with that of *C lovéni.* The prolongation of the sixth pair of pleurae into long, free curved spines

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extending some distance behind the tip of the pygidium is exhibited in many of the Girvan specimens.

The pygidium is narrower and the axis is rather longer, being three-fourths the length of the pygidium. It is regularly conical and tapers more slowly, the sides converging posteriorly at an angle of about twenty degrees. There are twenty-two to twenty-eight rings on the axis, interrupted along the middle line for the whole length, and it is generally devoid of tubercles; in this it differs from *C. lovéni.*

The lateral lobes are elongate and narrow, consisting of four pairs of pleurae. The first pleura is divided by a median groove into two equally strong, tuberculated ridges arising opposite the first three or four axial rings, and arching, at first slightly outward, then bending backward and slightly inward. The second pleura is smaller and lies almost parallel with the axis. It consists of a narrow anterior ridge and a slightly larger posterior tuberculated one. The third pleura is still smaller and lies almost parallel with the axis, only the posterior ridge being well developed, the anterior one being very narrow and not extending to the base of the pleurae, The fourth pleura is a very narrow, slightly tuberculated ridge lying closely pressed against the axis. The ends of the pleurae are gathered closely together behind the axis and then spread out in a fan-shaped manner to form the tip of the tail.

Brunmuck Group (Upper Bala), Thrawe, etc. (Upper Ordovician.)

Cybele bellatula balclatchiensis Reed, 1914.

Suppl., Tril. of Girvan, 1914, p. 41, pl. 7, fig. 6.

Sixth or seventh thorax segments having its pleurae much stouter, broader and longer than the preceding ones in this variety, and produced backward as long, curved spines as far as, or further than the tip of the pygidium, as in *C. lovéni girvanensis;* the pleurae of the segments behind the sixth likewise elongated into spines which decrease successively in length. (Brögger, Die Silur. Et. 2 and 3, p. 136, pl. 6, fig. 2, has shown this feature to exist in *C. lovéni.* In the American *C. winchelli,* which Slocum refers to a new genus *Cybeloides,* only the sixth pleurae are elongated and enlarged.) Other thoracic pleurae with a strong, rounded median ridge having a narrow, depressed band on the edge, as in *Cybele bellatula.*

Pygidium triangular, with a narrow ridge and a pointed, conical post-axillary piece extending from its tip to the margin, and with the same spinose posterior pleurae; axis with seventeen or eighteen narrow, incomplete rings, the median one-third smooth, with a pair of small tubercles located on each ring where it abuts on this smooth zone; lateral lobes with four pairs of pleurae, the two posterior ones rendered indistinct by a curious subreticulate ornamentation covering the surface, consisting of circular, elongated or irregularly fused pits; pleurae duplicated, being composed of two unequally developed ridges, the posterior stronger, and all ending in free, slightly recurved points on the margin, successively reaching further back along the sides of the pygidium.

The ornamentation of the lateral lobes of the pygidium sufficiently distinguish the variety from *C. bellatula.*

Balclatchie Group, Llandeilo (Middle Ordovican).

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Cybele michelli Reed, 1914.

Trilobites of Girvan, 1914, p. 42, pl. 7, fig. 7.

Cephalon transversely semicircular, rather more than twice as broad as long, slightly arched forward on each side and in front of the glabella. convex, bent strongly on each side and produced back to the genal angles; cheeks swollen, much elevated, subconical, and rising steeply from the anterior margin and dorsal furrows; genal angles blunt; upper edge of the rostral shield appearing on the upper surface of the cephalon and forming a preglabellar border; glabella subclavate, expanding slightly in front of the anterior lateral furrows, convex, rounded, swollen, nearly touching the front border, and encircled in front by a rostral suture, with no distinct preglabellar band; three pairs of lateral glabellar furrows represented by short, deep, transverse pits, not connected with the dorsal furrows, set at equal distances apart and successively increasing in size posteriorly; anterior pair located rather in front of the middle of the glabella; occipital ring rounded, widest in the middle, marked off from the glabella by a furrow, strongly arched forward in the middle, with a deep pit on each side similar to, and in line with the lateral pits on the glabella.

Rostral shield with the upper edge rounded, smooth, forming a narrow preglabellar marginal border, lying between the connceting sutures, and in front of the rostral suture, on the upper surface of the cephalon, about one-third the width of the glabella; dorsal furrows slightly diverging anteriorly, with large, rounded, deep pits situated on each side of the frontal glabellar lobe at the point where they fork, the outer, stronger branch bending out and continued into the marginal furrow of the cheek, the inner, weaker branch continued round the front end of the glabella, so that they separate the subtriangular, swollen anterior end of the fixed cheeks; surface of glabella coarsely, but sparingly tuberculated, and with a line of three equidistant, specially conspicuous tubercles at the front end just above the marginal furrow; middle tubercle the smallest, with the large tubercle on the anterior end of each fixed cheek continuing the line laterally.

Fixed cheeks much swollen, rising suddenly and steeply from the dorsal furrows, bearing three large tubercles in front of the eye and a large one at the anterior end, in the angle between the branches of the dorsal furrows; posterior wings of the fixed cheeks extended laterally, narrow from back to front, with smaller and fewer tubercles; pleuro-occipital ring narrow, rounded, not tuberculate, marked off by a deep furrow; facial sutures with posterior branch nearly parallel to the posterior margin of the cheek, cutting the outer margin a short distance in front of the genal angles; anterior branches running forward from the eye and slightly converging as far as the pits in the dorsal furrows, in front of which they curve sharply inward, bending round and uniting in front of the glabella to form the rostral suture; two short connecting sutures, directed nearly at right angles to the rostral suture, and cutting the anterior edge of the cephalon about one-third the width of the glabella apart, with the rostral shield between them.

Free cheeks large, triangular, with the inner portion swollen and steeply rising from the marginal furrow, coarsely tuberculated on the upper, anterior portion; eyes far back, opposite two lateral glabellar furrows and about a quarter the width of the cheek from the side of the gla-

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bella, prominent, placed a little on the outer slope of the subconical cheeks; border of the free cheeks broad, elevated, somewhat flattened, with an inner row of 7-9 large, equidistant tubercles and a less regular outer row of more numerous, but smaller ones; anterior process embracing the outer one-third of the front of the glabella; marginal furrow rather weak.

Thorax of thirteen segments; axis convex, cylindrical, slowly tapering, with swollen, lateral lobes on each ring and deep pits in the dorsal furrows between them; pleaurae horizontal and straight as far out as the fulcrum, then bent gently downward and backward, composed of a broad, anterior, depressed band, somewhat flattened and widening toward the pleural extremity, a narrower posterior depressed band, and a broad, strongly raised, rounded, slightly diagonal median ridge; ends of the pleurae not preserved; surface of the thorax finely tuberculated with one or two large, isolated tubercles on the median ridge of each pleura.

Pygidium subquadrate, narrowing slightly posteriorly, with the pleurae of the lateral lobes ending in short, free points at the same level along the straight, posterior margin; axis about one-third the width of the pygidium, broad, subcylindrical, very slightly tapering, composed of four rings at the anterior end corresponding to the four pleurae, followed by ten to twelve rather narrower rings, all incomplete in the middle; a short, pointed piece behind the end of the axis separating the extremities of four pairs of pleurae; pleurae four on each side corresponding to the anterior axis rings, lying in nearly the same plane and successively less strongly arched outward; the four pairs nearly straight and lying closely pressed against the axis; each pleura with a diagonal furrow, less than its length, cutting off a narrow anterior band; extremities of the pleurae short, free, slightly bent outward, ending at the same level posteriorly; one or two tubercles present along each pleura.

Balclatchie Group, Ardmillan and Dow Hill, (Upper Ordovician).

The peculiar position of the rostral suture and shield in this species as described above is also met with in *Cybele affinis* Schmidt. Apart from this one feature, the other characters of the cephalon bear a considerable mutual resemblance to *C. wörthi* and *C. kutorgae,* which are closely allied, but the Girvan form is undoubtedly distinct.

Cybele mira Billings, 1865.

Palaeozoic Foss. Canada, Vol. 1, p. 292, fig. 282.

Cryptonymus (*Atractopyge*) *mirus* Vogdes, Monog. *Zethus,* etc., p. 34.

Encrinurus mirus Narraway & Raymond, Ann. Carnegie Mus., Vol 3, p. 597.

Cybele mirus Clarke, 1894. Geol. Minnesota, p. 743, (Middle Ordovician, Trenton).

Description drawn from a detached head and tail from Table Head and Pistolet Bay, etc., Newfoundland. The pygidium only, as the head belongs to the genus *Amphion.*

Pygidium elongate, conical, convex; axis twelve to fourteen distinctly defined joints; pleurae double, consisting of four pairs of narrow pleurae; the last pair commencing about midway of the axis and extending backward parallel, or converging toward the rear margin; four principal pleurae terminating in short spines.

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The tail should be compared with *C. verrucosa,* from which it differs by a less number of axial joints, but it may be a young specimen.

This species was referred to *Cybeloides* by Bassler, Bibliography of Silurian Fossils of N. America.

Cybele ovata Etheridge, 1876.

Mem. Geol. Sur. Lake Distr., 1876, p. 112.

Cybele ovata Postlethwaite & Goodchild, Geol. Assoc., Vol. 9, 1886, pp. 464-465, pl. 8, fig. 17, 19.

Body broadly ovate or obtusely tapering towards the pygidium.

Cephalon semicircular; genal angles with short spines; glabella expanding slightly towards the front, which is well rounded, with the upper, middle and lower basal furrows well developed; cheeks ornamented with lateral ridges and furrows in a line with the lobes and furrows of the glabella; eyes distinct.

Thorax with twelve segments; axis narrow and appearing to have been tuberculated; pleurae double the width of the axis, nearly flat, bent downward from the seventh segment, the ends free and bluntly pointd; anterior seven pleurae curving upward; the whole surface minutely tuberculated.

Pygidium with a narrow axis and four pairs of pleurae, the pleurae much curved downward, parallel to the axis, the lower pair meeting beneath the mucro.

This form differs essentially from the two known forms, *C. rugosa* and *C. verrucosa,* species not at present known below the Caradoc rocks.

Skiddaw Slates, Sandy Beck, three miles south of Cackermouth. (Lower Ordovician.)

Postlethwaite, pl. 8, fig. 19, published for the first time a figure of Etheridge's original *Cybele ovata.*

None of the specimens give any trace of the facial suture and Postlethwaite remarks: "So that the precise affinities of both fossils (fig. 17 and 19) have to be inferred from other less reliable data. The form of the glabella in No. 17 cannot be made out with certainty, as the fossil has been somewhat distorted; but for that consideration, there is much about the aspect of the fossil under consideration that might have suggested its affinity to *Olenus.*"

Cybeloides primus (Raymond, 1905).

Glaphurus primus Raymond, Ann. Carnegie Mus., Vol. 3, 1905, p. 262, pl. 14, fig. 7-9.

Cybele valcourensis Raymond, Ann. Carnegie Mus., p. 262.

Cybeloides primus Slocum, Field Mus. Nat. Hist., Geol., Vol. 4, 1913, p. 64.

Only the glabella and free cheeks known.

Cephalon short, broad, with wide glabella outlined by a narrow, but deep furrow; glabella moderately convex, having a central lobe which expands towards the front, and two small side lobes; this appearance is caused by three pairs of glabellar furrows, all of which are short and turn back-

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ward; the second pair runs back into the third and the third pair joins the occipital furrow; surface spinose; fixed cheeks very convex; eyes small, prominent; a convex spinose border separated from the cheek by a narrow furrow; a large spine at the genal angle; surface of the cheek pitted all over except just below, and a little in front of the eye, where there is a group of small spines.

Chazy Group at Valcour, New York. (Lower Ordovician.)

Cybele panderi Schmidt, nom. nov.

Rev. 6, Ostb. Sil. Tril., 1907, p. 19.

Dr. Schmidt gave this new name to the species described as *Cybele bellatula,* Rev. 1, p. 203, pl. 13, fig. 9-13; pl. 15, fig. 1-5. He includes under it *Zethus verrucosus* Pander, pl. 4, fig. 4; pl. 5, fig. 5, and Volborth, Verh. Miner. Ges., 1847, p. 8, pl. 1, fig. 5-7, and Eichwald, Leth. Ross. p. 1417, 1860.

B/3a, B/3b, C/1a. (Middle Ordovician.)

Cybele rex (Nieszkowski, 1857).

Archiv. für Naturk. Est. Liv. und Kurl., Ser. 1, Vol. 1, p. 614, pl. 1, fig. 3.

Zethus rex Nieszkowski, 1857, l. c.

Zethus rex Schmidt, Archiv. für Naturk., etc., Vol. 2, p. 190, (ex parte).

Cryptonymus rex Eichwald, 1860, Leth. Ross. Anc. Per., p. 1419.

Cybele rex Schmidt, 1881, Mem. Acad. Imp. des Sci., Ser. 7, Vol. 30, p. 209, pl. 13, fig. 21-23; pl. 14, fig. 3, 4; pl. 15, fig. 8, 9.

Cryptonymus (*Cybele*) *rex* Vogdes, 1878, Monog. Genera *Zethus;* etc., p. 30.

Description from a head from Wesenberg, Wannamois, Russia.

Head semilunar; genal angles with short spines; glabella wide in front, narrowing towards the base, convex in the center, and having on each of its slopes, on both sides, three deep oval notches which are combined with the dorsal grooves; four pairs of smooth tubercles on the glabella, in two lines converging towards each other posteriorly; limb of the glabella with five short, equidistant spines in front, giving a crown to the glabella from which it takes its name; limb wide and thick, its surface bearing large tubercles running in irregular lines; facial suture running as is usual in this family, and having a row of small tubercles on each side of the line; cheeks striated, convex, as is the glabella; eyes situated on the anterior portion of the cheeks, elevated, pedunculatd, small and club-shaped; occipital ring wide, with four tubercles.

Pygidium with four pleaurae; axis convex, with sixteen or seventeen joints, the first three or four extending across, the others notched at the sides, (Schmidt).

Prussian, Macklenburg, Estland. C/1b, C.3. (Middle Ordovician).

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Cybele revaliensis Schmidt, 1881.

Mem. Acad. Imp. Sci., Ser. 7, Vol. 30, p. 207, pl. 13, fig. 20; pl. 14, fig. 6; pl. 15, fig. 6, 7; pl. 16, fig. 40.

Zethus sp. Steinhardt, Preuss. Geschieben gefundenen Trilob., p. 53, pl. 5, fig. 8.

Head crescent shaped, 2½ times as wide as long, with broad, rounded genal angles; dorsal grooves rather shallow at first, running in a vertical direction, then curving and joining the perfectly flat marginal limb furrow; frontal groove also entirely flat with scarcely deepened ends, running at a sharp angle to the dorsal groove, and surrounding the glabella in a gentle curve which separates it from the frontal rim; glabella flatly convex, almost rectangular, about one and a half times as long as broad, having a bow shaped rim so shaped that the frontal lobe has an oval form; side lobes not well developed, therefore the lateral furrows appear as lateral depressions of the glabella and do not reach the dorsal grooves; anterior furrow strongly marked at the front, the others only slightly; a fourth depression, which terminates in the dorsal groove and continues in the neck furrow, on both sides of the neck ring, parallel to the posterior rim on each side; in front of the first side furrow, and on a line with it, a plainly marked depression in the dorsal groove (the end groove); a plainly rounded tubercle at the point where the frontal groove branches off over this groove, in the angle between the dorsal and frontal grooves, and at both ends of the frontal lobe; frontal rim also exhibiting tubercles, five in number, which, however, are only faintly indicated; surface of the glabella generally perfectly smooth, but four pairs of tubercles can be distinguished in perfectly preserved specimens.

Cheeks very broad, twice as broad as the glabella, drooping sideways; faint depressions close together on the surface, as in other species, but no tubercles, or only very faint ones on the limb; eyes very far back, a distinctive characteristic of the species, and opposite the third side lateral furrow of the glabella; facial suture extending from the first lateral furrow of the glabella, at an acute angle, towards the eye, the posterior branch running parallel to the posterior margin of the head; viewed from the front, the front rim of the head shield forming a simple bow on each side, without an excrescence as in *Cybele bellatula,* in place of which the straight frontal edge of the glabella appears with the broad snout section, which is immediately beneath it; rim with fine tubercles and notched.

Pygidium, pl. 14, fig. 6; pl. 15, fig. 7; pl. 16, fig. 40, only partially preserved in our specimens, necessitating a reconstruction out of several fragments, broadly triangular, apparently broader than long, the side sections drooping less markedly than in the foregoing species; pleurae four, segments of the axis seventeen, only four of which are complete, the others only slightly indicated in the middle, and there depressed so that two raised ridges show on the side; some fine tubercles on the flat middle, placed singly or in pairs.

Pleurae, as in the preceding species, consisting of a main and a secondary rib, only the first extending to the rim and covered with faint tubercles in a row, (pl. 16, fig. 40); pleaurae ending towards the outer edge in short, exposed points, (pl. 15, fig. 7) forming a curve drawn forward;

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extending from the axis, a short projection, tending downward and notched on top, pushed between the bases of the two outside points.

Estland, C/1b. (Middle Ordovician).

Cybele sextuberculata Reed, 1899.

Quart. Jour. Geol. Soc., Vol. 55, 1899, p. 752, pl. 49, fig. 8.

Described from a slightly distorted head shield.

Glabella strongly convex and club shaped, anterior one-third, forming the frontal lobe, expanding suddenly to about double the width of the neck; three pairs of small, deep, equidistant pits indicating the sides of the narrow, neck-like part of the glabella and a pair of similar pits at the end of the faint occipital groove; front pair just behind the point where the glabella widens into the frontal line; three pairs of large, equidistant tubercles along the glabella, the anterior pair being on the frontal lobe; four or five similar, conical tubercles projecting forward along the front edge of the glabella; surface finely granulated; axial furrows wide and deep; fixed cheeks about twice as wide as the glabella at its base, strongly convex, bending downward and backward towards the genal angle; a distinct ridge running outward close to the anterior edge of the fixed cheek, from the base of the frontal lobe of the glabella to the eye; two large tubercles in front of this ridge and two similar tubercles in a line behind it, parallel with the axial furrow; another smaller one lying nearer the genal angle; surface finely granulated; neck furrow broad, though shallow, neck segment narrow, rounded and tuberculated.

Affinities:—The club-shaped glabella and short, pit-like furrows resemble *Cybele brevicauda* Angelin, but the eye ridges and sparse tubercles on the glabella, with the large, anterior marginal tubrcles, recall *Cybele coronata* Schmidt, and *C. rex* Nieszkowski.

Length of cephalon 5, width 10 mm.

Tramore Limestone Series, Newtown Grove, County Waterford, Ireland. (Bala).

Cybele rugosa (Portlock, 1843).

Rep. Londonderry, etc., p. 302, pl. 5, fig. 10, as Ogygia rugosa.

Cybele rugosa McCoy, Brit. Palaeozoic Rocks, pl. 16, fig. 8.

Cybele rugosa Salter, Appendix, Brit. Palaeoz. Rocks and Foss. p. 111, pl. 1G, fig. 8.

The author illustrates a fragment of a tail. The original description is a follows:

"The axis lobe is divided into a great number of very thin (ring-like) segments. The sides appear to be entire, though strengthened by narrow ribs with thickened ends, all inclining backward; the surface between the ribs is roughened with irregular dots, giving the whole a rugose appearance."

Salter, 1. c. gives the following description of *Cybele rugosa* Portl.:

"Caudal shield long, triangular; axis equal to the deflected side lobes, with about twenty-eight rings, effaced down the middle, which is occupied by a broad, smooth band; in the upper three-fourths these rings at inter-

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vals become stronger and more prominent, but there are no tubercles down the center line; side lobes more prominent at first than the axis, but towards the end of the tail strongly bent down; lateral ribs five, directed longitudinally, each with three or four tubercles; an intermediate rib and rugose surface between the upper ones; the last two or three from each side uniting beyond the axis in a 4-5 spined point, etc. Coniston Limestone."

The species referred to *Cybele rugosa* (Portl.) by Nicholson & Etheridge, Monog. Sil. Foss. Girvan Dist., p. 112, pl. 14, f. 13; pl. 8, fig. 5-7, has been referred by Reed to *C. lovéni.*

Lower Portion Ordovician Schist, Deserterat, Tyrone, Ireland. Lower Llandovery. (Upper Ordovician).

Cybele spicata Raymond, 1921.

Geol. Sur. Canada, Mus. Bull. No. 31, 1921.

Known only so far from an imperfect cranidium.

Glabella moderately convex, outline concave at the sides, expanded in front; sides indented by three pairs of short, but deep glabellar furrows, which have the form of transverse pits connected by shallow depressions with the dorsal furrow, with their ends running as shallow furrows into the more convex median portion of the glabella; a narrow furrow at the anterior margin of the glabella in front of which rise five large spines; a row of pairs of sharply conical pustules along the top of the glabella; fixed cheeks wide and not extending far forward; eyes located on a small mound and rather far back for the genus; genal angles rounded ? perhaps spinous.

The species is exceedingly like *Cybele coronata,* with its five short spines on the frontal margin.

Collingwood Limestone, Craigleith, Ontario. (Ordovician.)

Cybele tramorensis Reed, 1895.

Geol. Mag., Vol. 2, p. 48, pl. 7, fig. 1.

Cybele tramorensis Reed, 1899, Quart. Jour. Geol. Soc., Vol. 55. p. 750, pl. 4.

Description from a spatulate-fronted head.

Head semicircular, twice as long as wide; glabella oblong, slightly elevated above the cheeks; side furrows three, the anterior furrow merely an elongated deep pit, therefor the frontal lobe is marked off by this pair of isolated pits; middle side furrow obliquely set at an angle of about seventy degrees; third furrow parallel to, and as deep as the second at its inner end, but it does not decrease in depth to the same extent in its outer portion; dorsal grooves shallow, in front of the first lobe practically nonexistent, as the ocular ridge and terminal pit lie across their forward course; anterior end of the glabella steep and abruptly truncated, separated from the peculiar anterior margin by a faint depression; middle portion of the anterior margin projecting one-third the length of the glabella as a median, flat, spatulate process, transversed by five flattened ridges separated by faint grooves, fan shaped; a rounded ridge slightly in front of the

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anterior, outer angles of the frontal lobe of the glabella running forward and slightly outward to become a prominent tubercle projecting beyond the margin, corresponding to the side tubercles of *Cybele coronata* Schmidt; a deep circular pit in the anterior end of the dorsal groove close beneath the posterior outer slope of the ridge leading up to the side tubercles; an ocular ridge running outward to the eyes at right angles to the axis of the glabella, and opposite the first side furrow, having a row of minute pits close to the base at each side and bearing two large tubercles.

Eyes small, nearly equal to the width of the frontal lobe of the glabella; principal portion of the cheek lying behind the ocular ridge; genal angles bluntly pointed; surface with a few (2-3) large tubercles.

The specimen described in the Geological Magazine was from an imperfect head shield; another specimen from the Dublin Museum described in the second paper shows that the posterior outer portion of the fixed cheek is much produced laterally, and the posterior border of the cheek curves steadily backward to the genal angle, which is bent downward and produced into a rounded spine.

The eye ridge runs at a right angle to the axial furrow, from the level of the anterior glabellar furrow to the base of the long, stalk-like eye lobe, which is located at a distance from the axial furrow about equal to the width of the glabella, and directed forward, outward and upward. There are three large tubercles on the fixed cheek.

Bala Group, County Waterford, Ireland. (Upper Ordovician).

Cybele verrucosa (Dalman, 1826).

Head of a Trilobite, Brongniart, 1822, Hist. Nat. Crust. Foss., p. 145, pl. 4, fig. 11.

Trilobites velatus Schlotheim, 1823, Nachtr. Petrifac. 11, p. 40, pl. 22, fig. 5.

Calymene? verrucosa Dalman, 1826, K. Svensk. Vet. Akad. Handl., p. 285.

Calymene verrucosa Dalman, 1828, Palaed., p. 76.

" " Dalman, 1828, Vet. Akad. Arsb., p. 134, note 2.

" " Férussac, 1829, Bull. Sci. Nat., Vol. 19, p. 128.

Calymene bellatula Eichwald, 1840, Sil. Schicht, Estl., p. 66.

Cybele verrucosa Lovén, 1845, Ofv. K. Svensk. Akad. Forhandl., No. 4, p. 111, pl. 1, fig. 5a-f.

Trilobites (Calymene) verrucosus Lovén, 1845, 1. c. No. 3, p. 52.

Cybele verrucosa Corda, 1847, Prodrom., p. 205, pl. 5, fig. 52a-d.

" " Salter, 1848, Mem. Geol. Surv. Great Brit., Vol 2, p. 343.

Cybele sexcostata Salter, 1848, Mem. Geol. Sur., Vol. 2, p. 343, pl. 8, fig. 9 only.

Cryptonymus verrucosus Angelin, 1852, Pal. Scand., p. 4, pl. 5, fig. 1.

Zethus atractopyge McCoy, 1855, Brit. Pal. Foss., p. 156, pl. 1G, fig. 1-5.

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Cybele verrucosa Hoffmann, 1857-8, Verhandl. Russ Min. Ges., p. 32, pl. 3, fig. 3a-c. Copy of Volbroth's figure which Schmidt referred to *C. panderi.*

" " Hoffman, 1858, 1. c. fig. 4, referred to *C. bellatula.*

" " Salter & Woodward, 1865, Chart. Foss. Crust., p. 12, fig. 48.

" " Linnarsson, 1866, Om. Sil. Bild. Mellersta Westgöthland, 1866, p. 18.

" " Salter, 1867, in Murchison's Siluria, 4th Ed., p. 206, Foss. 48, fig. 2.

" " Salter, 1873, Cat. Camb. Sil. Foss., p. 51, fig. Entire with twelve thorax segments.

" " Nicholson & Etheridge, 1878, Mon. Sil. Foss. Girvan Distr., p. 111.

Cryptonymus (*Atractopyge*) *verrucosus* Vogdes, 1878, Monog. Gen. Zethus, Cybele, etc., p. 32, pl. 4.

Cybele verrucosa La Touche, 1884, Hanb. Shropshire, pl. 3, fig. 60.

" " Reed, 1906, Tril. Girvan Distr., Palaeont. Soc. p. 129.

The species would be difficult to recognize were it not for Lovén's accurate figures, which he took from a North Wales specimen. They are copied by Corda. The type of Dalman's species was the specimen figured by Brongniart from a drawing by Mr. Stokes of a Llandeilo specimen.

Species very large with the head more than three inches wide; eyes small and pedicled, located almost half way between the glabella and the anterior lateral margin; and nearly opposite the frontal furrow; genal angles obtusely spined; limb broad, with between the glabella and the sutures commencing on the outer margin of the head, just above the genal angles, running in a straight line to the eyes, thence to the anterior margin over the limb to the rostral shield; glabella clavate, marked by three lateral furrows, the frontal lobe broad; surface ornamented with tubercles.

Thorax with twelve segments, all the pleurae of equal length, and terminating in spines; ornamented with a central row of tubercles; axis with four tubercles on each ring.

Pygidium rectangular, ornamented with two lateral rows of tubercles; axial rings twenty, the first four extending across, the others notched at the sides; pleaurae four, with a central row of large tubercles, of equal length and extending just beyond the axial point.

Cybele verrucosa is a common fossil of the Ordovician of England and Sweden.

Ruedemann, Bull. N. Y. State Mus., No. 49, p. 67, makes *Zethus atractopyge* McCoy, *sexcostatus* and *rugosus* synonyms of *Cybele verrucosa.*

McCoy, British Palaeozoic Fossils, p. 157, remarks: "In placing *Zethus atractopyge,* which is the *Cybele verrucosa* of Lovén, in the genus Zethus, I have been obliged to propose a new specific name for it, as it is not the *Zethus verrucosus* of Pander, and as I cannot agree with Volborth in referring it to the *Zethus bellatula* of Dalman."

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On p. 156, in describing the genus *Zethus,* McCoy remarks: "I follow Dr. Volborth in referring *Cybele* of Lovén to *Zethus* of Pander, and, after a most careful consideration of the different species, I find so imperceptible a gradation in the structure of the pygidium from *Atractopyge,* in which the four upper anal segments are prolonged into the side lobes and deflected close along the axis (believing with Lovén that those are really pygidial segments), to those in which two or three more lateral ribs are added, that I also feel satsified that *Atractopyge* of Hawle and Corda should be added to Zethus."

For this reason McCoy used the generic name of those authors to designate the species (*Zethus atractopyge* Corda).

Range: Westergotland, Div. 4, *Trinucleus* Shale; North Wales, Bala; Girvan District, Llandeilo.

Salter, Mem. Geol. Sur. United Kingdom, Decade 7, pl. 4, p. 4, remarks: "We first described *Cybelle sexcostata* in 1848 in the work above referred to, under the same name. In those figures there was associated with the tail, but only provisionally, a coarsely tuberculated head, (pl. 8, fig. 9,) which occurred so frequently in company with it, that the two might reasonably be supposed to belong to each other. The figure we now give justifies the caution there expressed, for it is the more clavate form of head, rarely occurring, which probably belongs to the species, the head figured in company with it, we are now all but certain, being that of *C.* (*Calymene*) *verrucosa* Dalman."

Cybele winchelli Clarke, 1894.

Geology of Minnesota, Vol. 3, p. 742, figure in text.

Described from an entire specimen with defaced head from the Galena Limestone of Fillmore County, Minnesota.

Head transverse, broadly rounded at the sides, somewhat concave on the frontal margin, which is slightly elevated.

Length 10, width 26 mm.

Genal angles spined, limb prominent.

Thorax subquadrate, tapering, with 12 segments; axis narrow, convex, one-fourth the width of the thorax; segments slender, distinctly grooved for their entire length, or to within a short distance of their ends; first five obtusely rounded at their ends, the last seven acute; the sixth greatly expanded at the line of geniculation, and each extremity is produced as a stout spine considerably beyond the end of the tail; the last six segments are like the first five in that they curve more abruptly backward with spinose terminations.

Pygidium short, narrowing in from the articulating ring of the axis very markedly to its pointed termination; axis with one entire joint and eight or nine notched at the sides; the acute end of the axis not reaching the end of the tail; pleurae four or five; the second, third, fourth and fifth pleurae ending in acute, free points which are directed outward.

Surface finely tuberculated; free cheeks slightly punctate or pitted.

Referred by Slocum to the new genus *Cybeloides.*

Middle Ordovician.

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Cybele wörthi (Eichwald, 1840).

Schichtensystem von Estland, 1840.

Cryptonymus wörthi Eichwald, 1840, Sil. Syst. Estl., p. 70.

Cryptonymus wörthi Eichwald, Leth. Ross., p. 1416, pl. 54, fig. 7, Bala.

Zethus bellatula Volbor. Verh. Min. Ges. Jahrg., 1848, p. 10, pl. 1, fig. 1-4.

Cybele wörthi Schmidt, Mem. Acad. Imp. Sci., Vol. 30, p. 214, pl. 13, fig. 14-17.

Cybele wörthi Vogdes, 1878, Monog. Gen. *Zethus, Cybele,* etc., p. 33.

Cybele cf. *wörthi* Wigan, 1888, Zeitschr. d. Deutsch. Geol. Ges., p. 90, pl. 10, fig. 18.

A very slender species, not longer than one and a half inches.

The difference between *Cybele wörthi* and *C. bellatula* consists in the termination of the facial suture and the location of the eye knobs. These latter are placed more to the front in *C. bellatula,* and opposite the first side lobe of the glabella in *C. wörthi,* the glabella being flat, with faint side furrows. In *C. wörthi* the facial suture terminates nearly parallel with the posterior margin of the head, as the eye knobs are placed nearer to this than to the anterior margin. In *C. bellatula* the eyes are located more to the front on both sides of the frontal lobe of the glabella, therefore the facial sutures run in an oblique line to the front from the genal angles. The lateral furrows of the glabella are distinct in *C. bellatula,* but in *C. wörthi* indistinct, the eyes being placed opposite the middle glabellar furrow.

The thorax has twelve segments.

The pygidium is oval, with sixteen axial joints extending across the axis, which ends in a point. There are four pleurae, the last pair enclosing the end of the axis. The center of each pleura is marked with a tubercle.

Pawlowsk, Russia, etc., B/3b. C/1a.

Petersburg & Estland; Mecklenburg. (Middle Ordovician.)

Cybeloides Slocum, 1913.

Field Mus. Nat. Hist., Geol. Series, Vol. 4, No. 3, 1913.

This new genus was suggested by Arthur W. Slocum, Geological Series, Vol. 4, No. 3, 1913, p. 63, Field Museum of Natral Histoury, Publication 171; also Geol. Surv. Iowa, Vol. 25, 1914, p. 212, pl. 17, fig. 1-4, together with *Cybeloides iowensis* sp. nov.

Generic description:

Body distinctly trilobate in outline aside from the spines, subovate.

Cephalon sublunate; genal angles produced into spines, in which the genus differs from Lovén's genus *Cybele* as exhibited in *C. bellatula,* as also in the form of the glabellar furrows; glabella divided by two longitudinal furrows into a central and two lateral lobes; lateral glabellar furrows indicated by three pits situated in each longitudinal furrow; eyes small, pedunculate; facial sutures originating on the lateral margins, somewhat in front of the genal angles.

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Thorax with twelve segments, the anterior five faceted at their distal extremities; the sixth segment abruptly bent backward at the lateral margin of the thorax and produced into a long spine, and this is true in some cases of all segments from the sixth to the twelfth.

Pygidium small; axis conical, with many joints; pleurae with few ribs.

Range in North America, Ordovician.

The author referred to the genus *Cybeloides* the following species: *Cybele ella* Nicholson & Raymond, *Glaphurus primus* Raymond, the synonym *Cybele valcourensis* Raymond, *Cybele winchelli* Clarke, *Cybele* sp. Ruedemann, 1901, and a new species *Cybeloides iowensis*.

Slocum remarks that the three European species, *C. grewingki*, *C. Kutorgae* and *C. revaliensis* exhibit a tendency towards the American forms.

Cybeloides iowensis Slocum, 1913.

Body depressed, convex, distinctly trilobed in outline aside from the spines, subovate, tapering rather rapidly to a small pygidum; surface finely granular, with many more or less prominent, rounded nodes.

Cephalon short, the width nearly three times the lengeth, outline sublunate, with the anterior lateral margins inflated; glabella convex, inflated anteriorly, somewhat longer than wide; median lobe clavate, narrow at the occipital furrow, gradually widening for about half its length, then abruptly widening to its greatest width, rounded in front; lateral lobes longitudinally oval; longitudinal glabellar furrows originating in deep pits on the occipital furrow, converging slightly, then curving forward and outward; position of the lateral furrows indicated by three pits in the longitudinal furrows; occipital ring prominent and more elevated than any other part of the caphalon, wide between the glabellar furrows, abruptly narrowing towards the dorsal furrows, bearing a median node with a smaller one on each side of it; occipital furrow shallow and ill-defined in the median portion, deepened into pits in the dorsal furrows.

Ornamentation of the glabella finely granular, with many rounded tubercles arranged in more or less uniform transverse rows; the largest two nodes close together near the anterior margin and pointing forward; a well marked circular pit on the median line of the glabella just in front of a line connecting the anterior pair of glabellar pits.

Cheeks large, depressed, convex, not rising as high as the glabella; genal angles produced into long spines which extend backward more than half the length of the thorax; marginal borders convex, posterior marginal furrows narrow and deep; lateral marginal furrows not well defined.

Posterior end of the facial suture originating on the lateral margin, just in front of the genal angles, passing almost straight to the palpebral lobes, after crossing which, the anterior portion extends forward for a short distance, then curves tbruptly towards the median line and again forward to the anterior margin.

Eyes small, pedunculate, situated on a line with the anterior pair of glabellar pits near the dorsal furrows; a pair of ocular fillets connecting the eyes with the anterior lobe of the glabella; cheeks inside the marginal border reticulated or covered with a row of pits; surface of the marginal borders granular like the glabella; many tubercles irregularly distributed over the cheeks, these nodes averaging sometimes larger than those on the

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glabella, the larger ones being on the posterior margin and pointing backward.

Thorax with twelve segments, rather rapidly tapering posteriorly, distinctly trilobed; axis convex, less than one-third the width of the thorax; pleurae curving gently for about one-half their length, then more rapidly to the lateral margin; each pleura divided unequally by a furrow extending nearly from the dorsal furrows to the ends; posterior portion wide and bearing numerous tubercles; axis with four tubercles and each pleura with two or more which are much larger than those on the axis; five anterior segments of the thorax short, the seven posterior segments abruptly bent backward and produced into spines, the spines of the six segments extending more than one-third their length beyond the pygidium, the spines of the other segments being considerably shorter.

Pygidium small; length along the axis 23.6 mm.

Lower Maquoketa Beds at Elgin, Iowa.

Inasmuch as such Palaeontologists as Lovén, Salter, Nieszkowski, Schmidt, Linnarsson, Törnquist, Clarke and Reed have placed under *Cybele* species with the genal angles extended into spines and the lateral furrows of the glabella with pits or depressions near the dorsal furrows, features indicated in the new genus *Cybeloides,* I cannot see any valid reason for retaining the genus.

DOUBTFUL FORMS WHICH HAVE BEEN REFERRED TO OTHER SPECIES.

Zethus verrucosus Pander, 1830.

Beiträge zur Geognosis des Russischen Reiches, 1830, p. 140, pl. 5. fig. 6; pl. 4C, fig. 4.

Cybele bellatula Schmidt, 1881, Rev. 2, Ostb. Sil. Tril., p. 203.

Zethus verrucosus Volborth, 1847, Verhandl, Min. Ges. Jahr., p. 8, pl. fig. 5-7.

Zethus verrucosus Pander, Eichwald, Ueber die Gattungen *Cryptonymus* und *Zethus,* 1855, p. 13.

Zethus verrucosus Portlock, 1843, Rep. Geol. Londonderry, p. 287.

Pander gives the following description of this species:

Zethus verrucosus, pl. 5, fig. 5; pl. 4C, fig. 4.

Unfortunately we possess only a fragment of this species and it is very probable that it belongs to *Entomostracus punctatus* Wahlenberg, (*Calymene punctatus* Dalman) but we observe from the few, though disturbed and fractured thoracic parts that still adhere to our fragment, that the sections, as well as the cephalon, are covered with small, raised tubercles lying in one row, whereas those of *Calymene* punctata appear entirely smooth. The cephalon, as we see, is divided by the prolongation of the dorsal furrows (back furrows), which run nearly parallel to the outer margin. There are transverse folds (lobes) on the glabella (middle head), as well as on Amphion frontiloba, but there is no trace of eye knobs. The surface of the cephalon is covered with tubercles. The side sections of the trunk are split by a fold, as in *Calymene... We* possess no pygidium and therefore are unable to determine definitely whether this species really belongs to the genus *Zethus.*

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Dr. Schmidt, Rev. 6, Ostb. Sil. Tril., 1907, p. 19, describes *Cybele panderi* sp. nov., and includes *Cryptonymus parallelus* Eichwald, a species which Volborth also placed under *Zethus verrucosus.*

Dr. Eichwald, 1855, p. 13, remarks on this statement of Volborth, "Dr. Volborth had no right to take *Cryptonymus parallelus* for *Zethus verrucosus* Pander, and attribute eyes and eye knobs and also a facial suture to the latter, notwithstanding that, in his work on the genus, Dr. Pander describes Zethus without eye knobs and its cheeks without furrows."

Cryptonymus parallelus Eichwald, 1840.

Schichtensystem von Estland, 1840, p. 73.

Zethus verrucosus Pander, Volborth, Verhandl. der Min. Ges., 1848, p. 8, pl. 1, fig. 5-7.

Cryptonymus parallelus Eichwald, Uber die Gattungen *Cryptonymus* und *Zethus,* 1855, p. 13.

Cryptonymus parallelus Eichwald, Lethaea Rossica, 1860, p. 1417.

Cephalon semicircular, large and flat; anterior lobe of the glabella not broader than long, provided on each side with three complete oblique furrows; anterior border of the head prolonged into a pointed projection with an additional point on each side; facial suture commencing at the genal angle, passing to the eye knob, which is situated almost on the anterior border of the head, then diverging parallel to the lateral border of its sides.

Thorax with the pleura of the sixth segment prolonged into a long point.

Pygidium ornamented with five pairs of pleurae running parallel to each other and almost of equal length.

Orthoceralites de Poulkowa and rare at Erras.

Schmidt, Rev. 1, 1881, united *C. parallelus* to *C. bellatula;* in Rev. 6, 1907, he made a new species for Volborth's figures 1-7, pl. 1, *Cybele panderi,* and included Eichwald's species.

Trilobites velatus Schlotheim, 1823.

Nachtr. 111, 1823, pp. 40 and 86, pl. 22, fig. 5, pygidium.

Asaphus velatus Holl, Petref, p. 175.

Trilobites velatus Dalman, Palaead., p. 288, German Ed. p. 76.

Trilobites velatus Lovén, K. Sv. Vetensk. Akad., 1845, p. 11.

Zethus verrucosus Pander, Volborth, Verhandl. Min. Ges., 1848, p. 8.

The species was referred to *Cybele panderi* Schmidt, 1907, p. 19.

Cybele valcourensis Raymond, 1905.

Ann. Carnegie Mus., Vol. 3, No. 2, p. 362, pl. 14, fig| 4.

Pygidium narrow, tapering almost to a point; axis narrow but distinct, not extending to the posterior end; axial rings sixteen to eighteen, only the first complete, the others showing only on the sides; four to five pairs of nodes located along the top of the axis at equal intervals along its length; a single median protuberance at the posterior end of the axis; four pairs of duplicated pleurae on the lateral lobes bending backward

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almost parallel with the axis, each pleura consisting of a smaller anterior and larger posterior portion; pleurae ending in short, rounded spines which extend a very short distance behind the border, and if broken, giving the appearance of an entire margin; a small node on each rib near the axis.

The species was referred by Slocum to *Cybeloides* as a snynonym of *C. primus.*

Cybele sp. Ruedemann, 1901.

Bull. N. Y. State Mus., No. 49, p. 66, pl. 4, fig. 12.

Pygidium axis long, conical, its annulations indicated only along the margin in the anterior part, suppressed in the middle part where the ornamentation consist of two pairs of tubercles, and extending entirely across the axis posteriorly; pleurae five pairs which leave the axis nearly at a right angle, but gradually become deflected to a direction parallel with the axis; a few tubercles on these pleurae.

Gray limestone pebbles of Rysedorph Hill Group.

This pygidium differs from *C. winchelli* in not having the pleurae deflected abruptly and in the tuberculation and the character of the annulations on the axis. Differs from *Cyvele mira* in its tapering axis.

Both these Trenton forms, especially the latter, may prove to be identical with Reudemann's species.

A specimen belonging to the writer differs in no essential features from the pygidia figured by McCoy as *Zethus atractopyge, sexcostatus* and *rugosus,* which names are synonyms of *Cybele verrucosa.*

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EXPLANATION OF PLATES.

Plate I.

Fig. 1. Cybele bellatula.

" 2. Cybele revaliensis, (after Schmidt, Rev. 1, pl. XIII, fig. 20a.)

" 3. Cybele coronata, (after Schmidt, 1. c., pl. XIII, fig. 24 a.)

" 4. Cybele mchenryi, (after Reed, Quart. Jour. Geo. Soc., 1899, pl. XLIX, fig. 7.)

" 5. Cybele tramorensis, (after Reed, 1. c., pl. XLIX, fig. 6.)

" 5a. Cybele tramorensis, (after Reed, Geol. Mag., 1895, pl. III, fig. 1.)

" 6. Cybele sextuberculata, (after Reed, Quart. Jour. Geo. Soc., 1899, pl. XLIX, fig. 8.)

" 7. Cybele bellatula, (after Volborth, Verhandl. Russ. K. Min. Ges., 1847, pl. 1, fig. 5.)

" 8. Cybele aspera, (after Linnarsson, K. Vet. Akad. Handlingar, VIII, pl. 1, fig. 11.)

" 9. Cybele vigilans, (after Hall, Pal. N. Y., Vol. 1, 1847, pl. LXV, figs. 2a, b, c, e, f, g, h.)

" 10. Cybele aspera, (after Linnarsson, 1. c., pl. 1, fig. 12.)

" 11. Cybele aspera, (after Linnarsson, 1. c., pl. 1, fig. 13.)

" 12. Cybele grewingki, (after Schmidt, 1, c., pl. XIV, fig. 1 b.)

Plate II.

Fig. 1. Cybele verrucosa, (after Angelin, Pal. Scand., pl. V.)

" 2. Cybele bellatula, hypostoma, (after Lindström, Visual Org. Tril., pl. 4, fig. 2.)

" 3. Cybele lovéni, (after Linnarsson, K. Vet. Akad. Handlingar, VIII, pl. 1, fig. 14.)

" 4. Cybele verrucosa.

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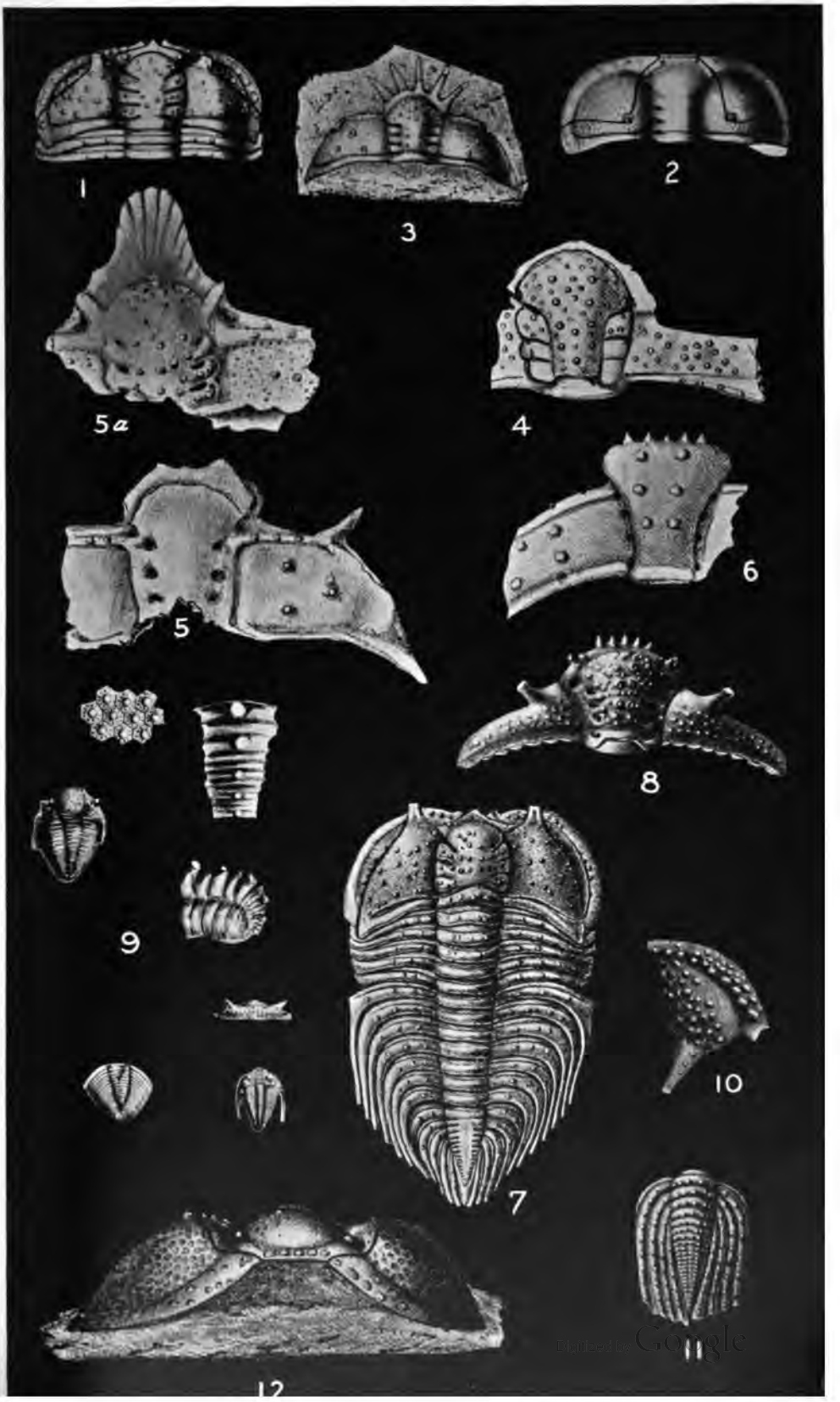

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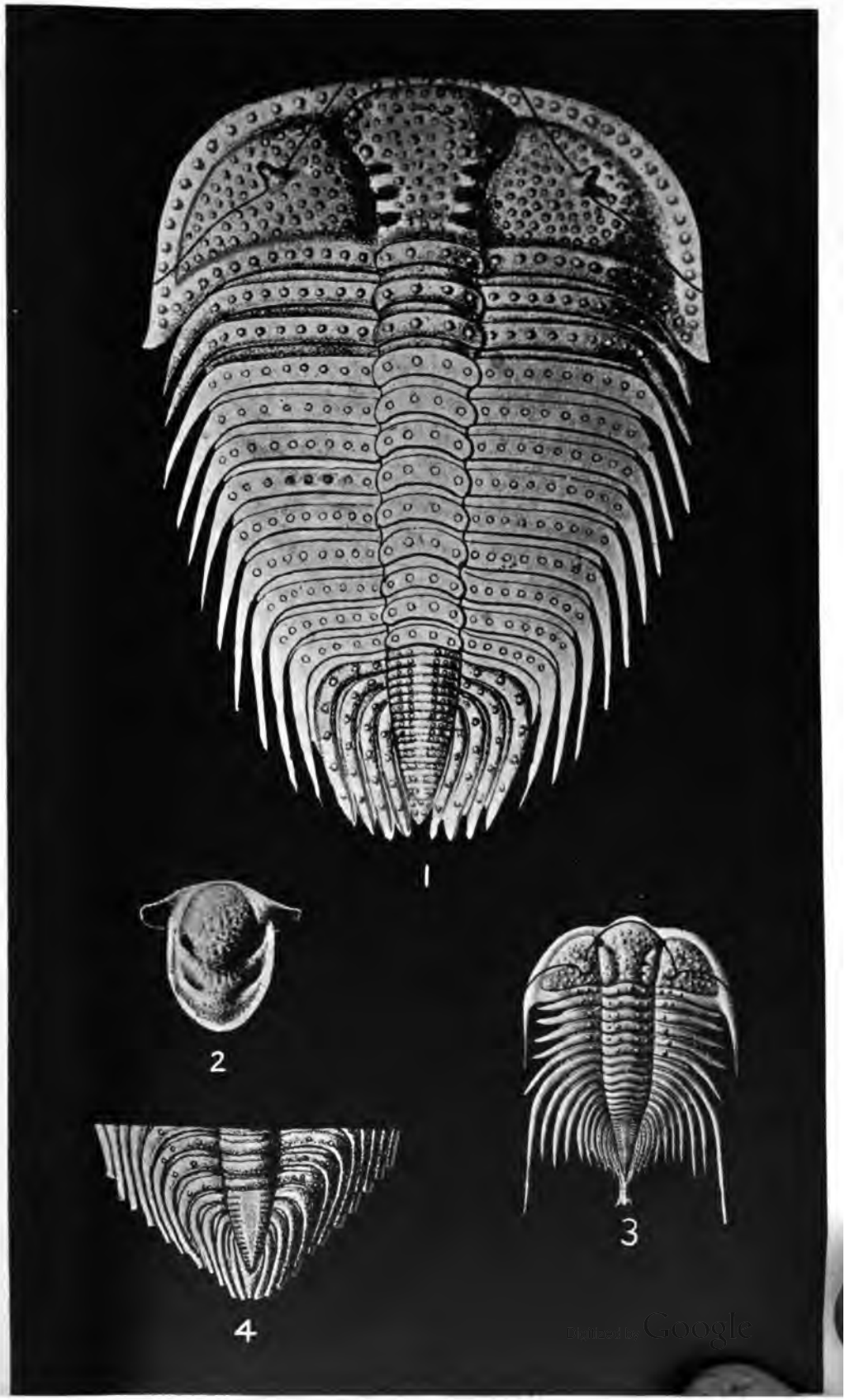

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